PENNSYLVANIA GAME NEWS

MAY, 1961

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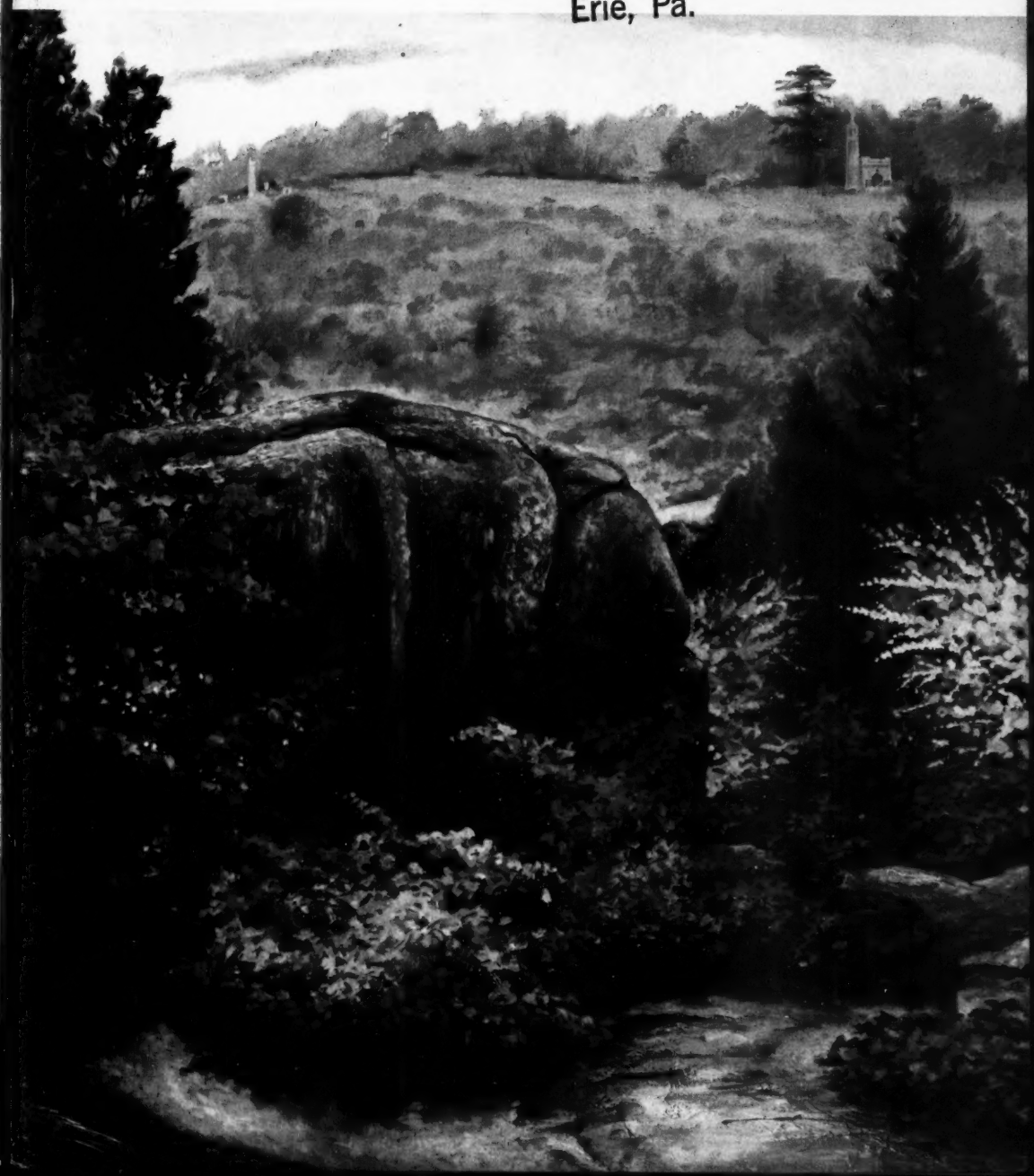

THE STORY BEHIND THE COVER

A CENTURY ago this nation, in her most tragic yet triumphant hour, fought a great war. In four years of Civil War there were almost 6,000 battles and skirmishes. Between the first roar of Confederate cannon at Charleston, S. C., on April 12, 1861, and the surrender at Appomattox Court House, Va., on April 9, 1865, more than 500,000 Americans had been killed in action or had died as a result of wounds, diseases or starvation. The loss was greater than in any war which we have fought, before or since.

This was a conflict in which mankind learned his basic training in modern warfare. Many of the principles used in later world wars were first tried and tested in the War between the States. On land, sea and air, two great armies learned new lessons in bloody combat.

But then, as now, it was the citizen soldier who always turned the tide of battle. It was the individual rifleman who ultimately spelled the difference, who survived the shrapnel and concussion of long-range weapons to pit his skill, blood and courage against his enemy. On both sides, it was the marksmen who could hit the target with a rifle, pistol or carbine who spelled the difference between victory and defeat. In the Civil War, as in World War I & II, it was the American farmer or hunter or non-professional foot soldier who changed the course of history.

Devil's Den is located opposite Bloody Run from Little Round Top on the Gettysburg Battlefield. In May, the redbud is in bloom and the gray rocks are bathed in warm sunlight. It is quiet there now—a place of nesting song birds, spring flowers and gentle greenery. But on that terrible day in July, 1863, it was a hotbed of sharpshooters and snipers. The Army of the North fought for its possession. So did the Army of the Confederacy. Each side placed their best riflemen and sharpshooters among the boulders. They were instructed to single out individuals, particularly commissioned officers. And this they did. For three days this Devil's Den was a center for bitter fighting, a small corner on the carnage that raged all about. Snipers from both sides shed blood down the mossy rocks rising 20 to 40 feet in the air. Their bodies tumbled into the crevices or slumped behind the rocks, many not to be found for days after the battle was over. One man was found in a half-kneeling position in the cup of a peculiarly shaped rock. There was not a mark or scar upon his body. His rifle lay across the top of the stone, the butt against his shoulder, one arm extended along the barrel, while the other arm, crooked, with finger on trigger, was still in firing position.

His name is unknown; his contribution to the success or failure of his battle unit forever a mystery. But certainly this rifleman, like all those who fought and died in Devil's Den, exemplifies the most important fact of the Civil War—that victory belongs to the army best equipped with rifles and best composed of American riflemen. In an age of guided missiles, hydrogen bombs and electronic machines, it is well to remember this lesson from the past and this guidepost to the future.

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PENNSYLVANIA GAME NEWS

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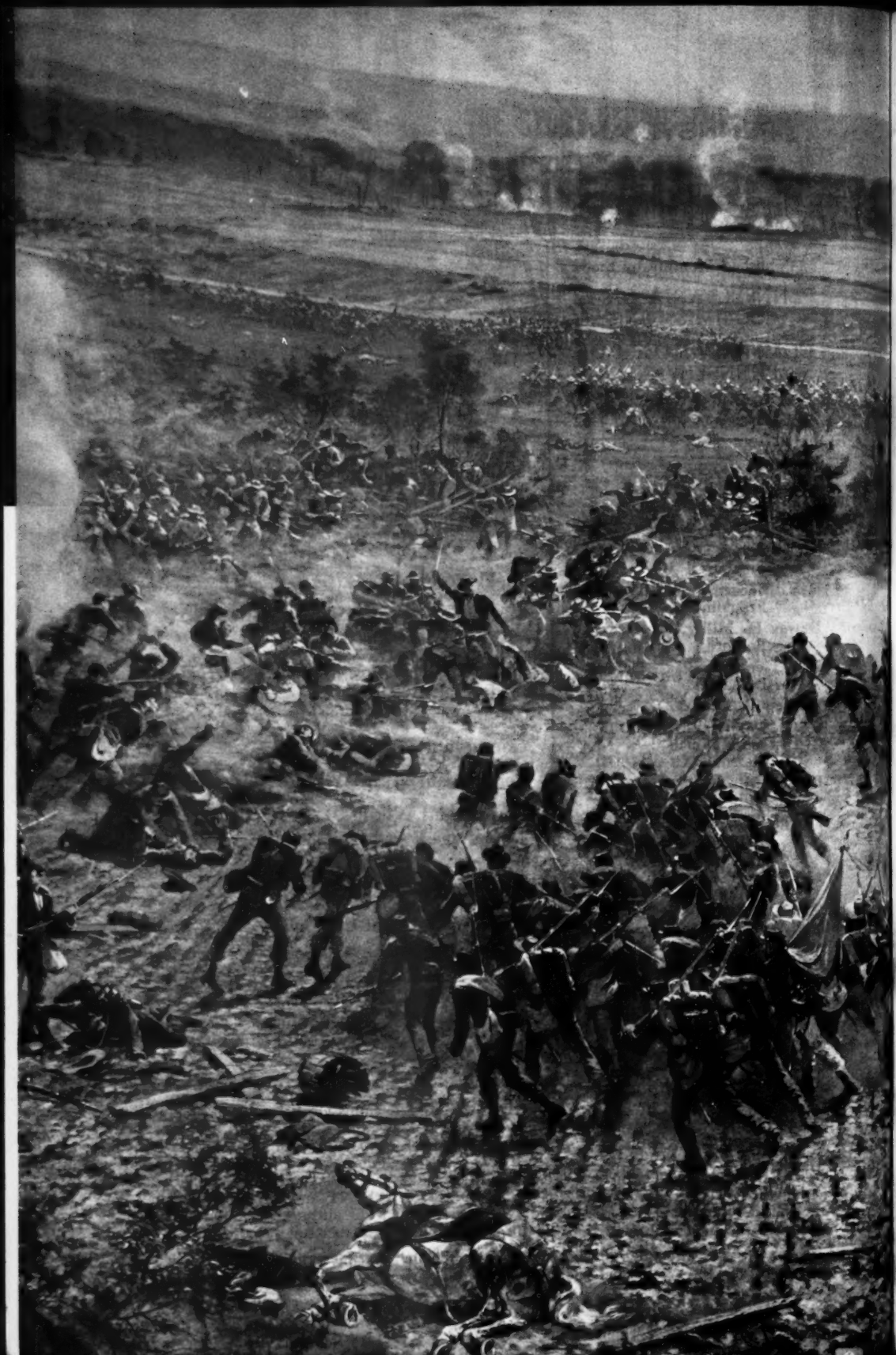
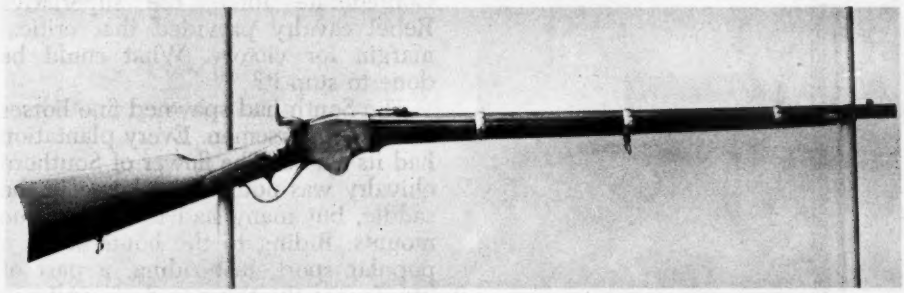


The Story of Spencer's Rifle At the Battle of Gettysburg...



Turning Point of the Civil War

By Charles K. Fox

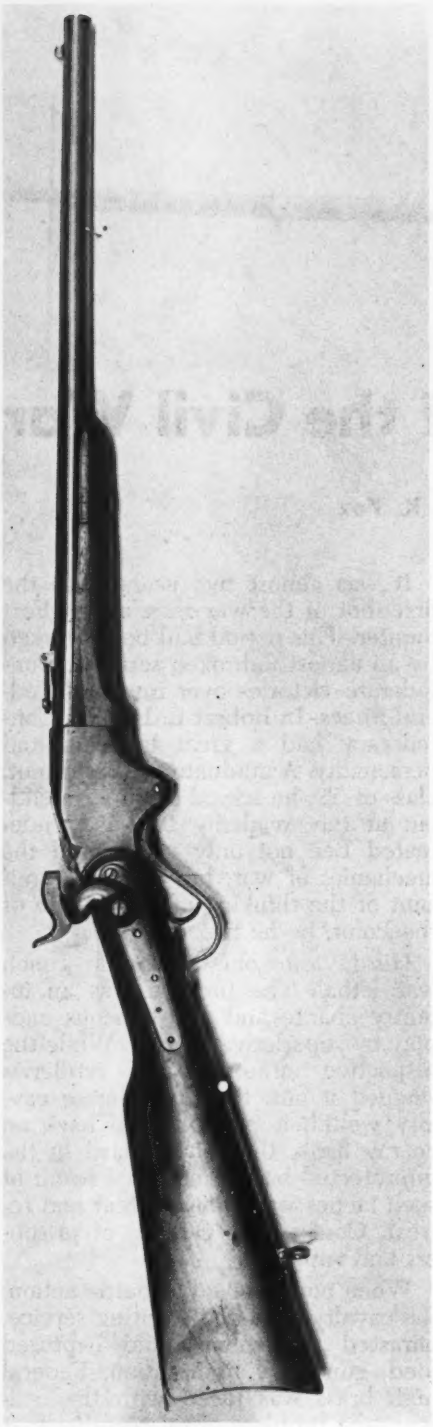
THE victorious Confederate force, the Army of Northern Virginia, had begun its invasion of the rich North. Such a plan was no secret, for Southern papers had announced in advance, not prophesied, the campaign. During the summer of '63 the Southerners would live off the land, capture needed supplies, and cripple the Union. That was the blueprint. Philadelphia, New York, Baltimore, and Washington, the Federal capital, were threatened. Should the plan of Lee, Jackson, and Jefferson Davis to capture the major Northern cities become a reality, intervention by England and France should be a certainty. The end of the war could even be more elementary than that: The defeat of the Union Army on its own soil might sever the strained bonds holding the Union together and quickly establish peace on the basis of Southern independence.

PICKETT'S CHARGE was the climax of the three-day battle and marked the "high-water mark of the Confederacy." This reproduction is from an oil painting by the French artist, Philippoteaux, the over-all dimensions of which are 370 feet in circumference and 30 feet in height. It can be seen in the massive Cyclorama at Gettysburg today.

It was almost two years since the first shot of the war rang out at Fort Sumter. This period had been marked by an almost unbroken series of Confederate victories over invading Federal forces. In Robert E. Lee the Confederacy had a great tactician and personality. A graduate of West Point, class of '29, he served as Superintendent at the Academy 1852-55. Undefeated Lee not only understood the mechanics of war, but he was cognizant of the thinking of a graduate of the Point, be he friend or foe.

His favorite one-two battle punch was lethal. The formula was an infantry charge and simultaneous end-play by superlative cavalry. While the respective infantries and artilleries slugged it out, the Confederate cavalry would, if possible, roll back an enemy flank, then strike hard in the unprotected back. The usual result of such tactics was Union defeat and retreat, Confederate capture of prisoners and supplies.

When not involved in battle action, the cavalry rendered scouting service, harassed the enemy, and captured food, guns and ammunition. Federal high brass was faced with the confounding problem of overcoming that



terrific attack by skilled horsemen. Even when the Federal infantry was equal to or the superior of the opposing Confederate force, the superlative Rebel cavalry provided that critical margin for victory. What could be done to stop it?

The South had spawned fine horses and great horsemen. Every plantation had its stable. The flower of Southern chivalry was not only at home in the saddle, but many had their own fine mounts. Riding to the hounds was a popular sport, just riding, a part of life. It was the thing to do to enlist in the cavalry. This branch of the Confederate service was regarded as supreme.

Neither Ordnance Department was in a position to pick and choose the implements of war. It was easier to draft a man than to service him with a gun and ammunition. At the outset the South had the better, but still a meager, supply. John B. Floyd, a Southerner who was Secretary of the War Department prior to the outbreak of hostilities, had channeled supplies to the arsenals of the South where they had been captured by the Confederacy. As time progressed, Northern gunsmiths feverishly produced the greater number; but it was discouraging to have so much of this valuable material of war captured by the Rebels.

To meet the crisis, both sides purchased from abroad. The result was that the junk arms of Europe were shipped to the States. Some of these guns were no better than clubs, and poor ones at that. The predominating results with the imported smoothbore rifle, which shot the round ball, were recoil, noise and smoke. Those which found their way into the South were

FIRST REPEATING RIFLE that functioned safely and fired metallic cartridges was the Spencer. Seven .50 caliber rim-fire cartridges filled a tube which was inserted in the butt of the stock; an eighth round could be placed in the chamber. With this weapon, a new dimension in firepower was first put into operation by dismounted Federal cavalrymen in the last week of June, 1863.

CULP'S HILL was the scene of bitter fighting from 4 a.m. until 11 a.m. of July 3, 1863, the third and last day of the Battle of Gettysburg. As painted by Peter Fredrick Rothermel, this scene shows the repulse of Johnson's Confederate Division by Geary's White Star Division.

delivered by blockade-runners.

The following had to take place between shots: One end of a paper-wrapped cartridge was bitten off with the teeth; the powder was poured down the gun barrel, and the bullet was dropped into the barrel. The ramrod of the gun was removed, then used to force the bullet down the barrel to rest lightly on the powder. The ramrod was then withdrawn and fastened to the barrel. The heavy hammer was cocked with the thumb, a percussion cap was placed over a nipple leading to the powder charge; and at last, discharge was effected by pulling the trigger, which struck the cap to ignite the powder and drive out the ball. Even a good man in the heat of battle could not average two shots a minute.

Breechloaders were showing up on a small scale in the hands of both the Blue and the Gray. By comparison with the muzzle-loader, the firepower of the single action breechloader, which involved the insertion of a cartridge, usually a paper one, was considerably greater. Although the muzzle-loader as a weapon of war was on its way out, circumstances forced many a soldier of each side to contend with it. Little wonder that the end of an infantry charge resulted in bayonet fights, clubbing duels, stone throwing and fist fights. Demand on the part of the fighting men was creating a greater evolution in firearms than occurred in any period of history since the invention of gunpowder, and the smart gunsmiths of the land were refining their wares.

Prior to the critical Battle of Gettysburg something was brewing behind Union scenes which was destined to affect the outcome of the war and the course of history. Actually there were two factors which, when moulded together in the course of subsequent events, exerted influence at Gettysburg and all that was to follow.

The God of War presented the Yanks a rare and unheard of gift: an accurate, well-balanced, easy-to-load, repeating rifle. From a cramped position behind a stone or tree, a soldier could insert seven metal cartridges into a tube, then ram the tube into the butt of the stock to be in alignment with the barrel. An eighth cartridge could be inserted in the chamber. The firepower of this lever-action repeater and extra, loaded cartridge tubes has been estimated to be twenty times as great as the hard-to-load muzzle-loader, and the chances of the

one loading the gun being shot in the process by the enemy, considerably lessened.

The joke of the war, to modern marksmen and hunters, came from the Federal Ordnance Department. Its Chief, James W. Ripley, and his boys were possessed with the mistaken concept that a man equipped with a repeating firearm would not take aim—just fire into the blue. They were not even interested in having a look at the invention of Christopher Spencer in spite of the scarcity of arms, and Ripley stated that he "would not approve the new-fangled jimcrack." Then, too, the muzzle-loader was bigger, cheaper, noisier, and less bullets were needed.

It seemed the Gods of War needed a special emissary to present the royal gift. Spencer had to be inventor, manufacturer and sales agent.

Late in the spring of '61 the youthful Spencer, age 27, was given the opportunity to demonstrate his gun to the Secretary of the Navy, Gideon Welles, and his associates. A handmade model was quickly taken apart and reassembled with a screwdriver. The weapon was then fired 250 times without cleaning, and as many as 21 shots a minute were discharged by its inventor. Reception was excellent and enthusiasm waxed strong.

There ultimately followed two Navy orders: the first for 700 rifles and 70,000 cartridges and the second for 600 rifles. The time had come for an assembly line and production; nevertheless, if volume were to be achieved and money made, Army orders were a necessity.

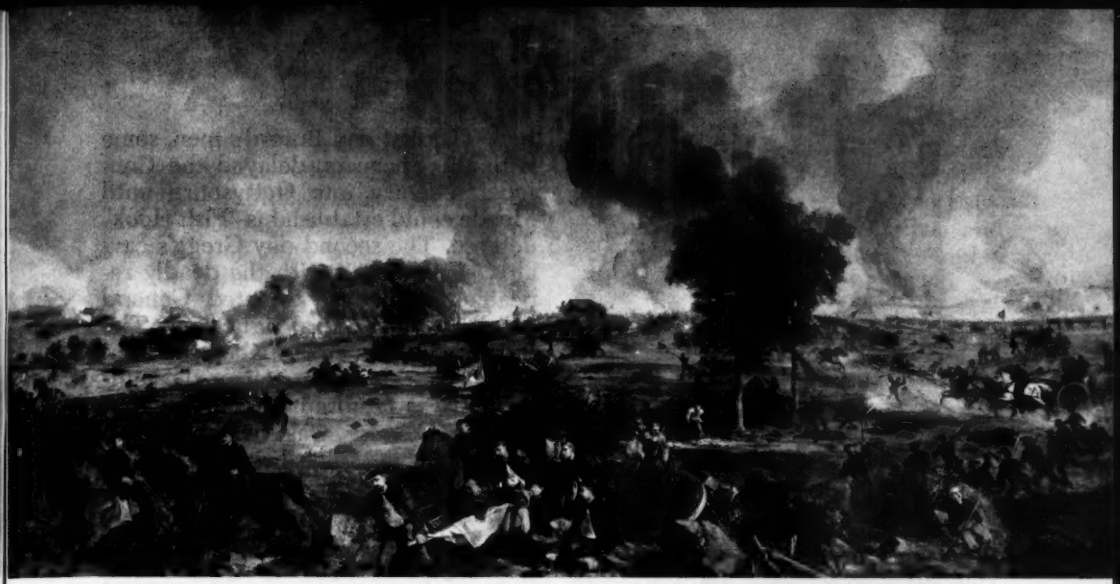
A half year after the episode, the gun was tested by a special Army board. It is speculation that this was instigated by G. B. McClellan, General in Chief, on the recommendation of Gideon Welles. The official report of the three-man board was favorable. One of the members was a Captain Alfred Pleasonton.

Late in '61 Welles once again lent his helping hand. He induced the powerful James A. Blaine, Speaker of the House of Representatives, to investigate the potential of the invention of his fellow New Englander. It must have been in open-mouthed amazement that Christopher Spencer saw the Secretary of the Navy write an order for 10,000 repeaters for the Army and the Assistant Secretary of War, Thomas A. Scott, sign it and hand it to him. At any rate, the company was saved from bankruptcy – once again there would be production at the plant.

Army Ordnance blocked further orders until President Lincoln himself target-tested the gun on the White House lawn in the company of Spencer, August 18, 1863. Lincoln insisted upon its adoption, and that terminated the selling career of Christopher Spencer.

Meanwhile Alfred Pleasonton had been elevated to the rank of Major General in charge of the Federal Cavalry, the same Pleasonton who served on the Army testing board for the gun. Therein is the great tie. To him fell the responsibility of developing a means to contend with the magnificent Confederate cavalry. Working closely with him early in '63 was the newly appointed Commander of his First Cavalry Division, Brigadier General John Buford.

The North could not amass great groups of hard-riding saber-slashing horsemen from their plow boys and city residents; there would have to be a substitute. An infantryman could ride well enough to get near the trouble-spot, dismount, advance, hide, and shoot. He could then run back to his horse, climb aboard, and either flee for his life or give chase to a retreating enemy. However, there was a complication: horses won't stand still. Organization was necessary. It would require one man out of every four to hold the horses behind the hill or in the woods as the others fought on foot from an advanced position. That was the Buford conception. Each would be equipped with Spencer's



SNIPER'S BULLET killed capable, highly regarded Major General John F. Reynolds, Commander of the First Corps, Army of the Potomac, as the battle of the first day surged on and around McPherson Ridge and Oak Ridge.

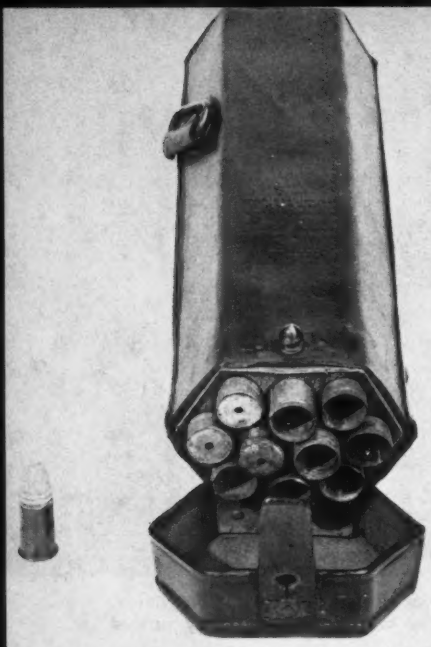
repeating weapon. Pleasonton insisted upon that. This would be the answer of the Yankees to the Rebels—J. E. B. Stuart in particular. Here, too, was a boon to intelligent individual action as compared to theoretic discipline.

There could have been a double conception of this new idea in warfare, each working independently of the other, but arriving at the same *modus operandi:* Out in the "West," Colonel John T. Wilder was arriving at the same conclusion and solution. Ultimately it is possible that research will establish a connecting link between him and Pleasonton in this thinking. At any rate, thought had crystallized and the wheels of organization were in operation. Mounted infantry armed with repeaters was going to be the compensating force. Infantry would become dismounted cavalry. West Point had never thought of that one. All available Spencers would be channeled their way, Army Ordnance to the contrary. In the future they would all be in the easy-to-handle carbine form. In a matter of weeks Buford, Pleasonton's strong right arm, was to distinguish himself at Gettysburg with this combination of firepower and mobility. (Later he was cut down by the army scourge, typhoid fever.)

The combination of mounted infantry and repeating carbines, the special advantage of the war, was destined to bring glory and fame in the two years to come to Union leaders: Grant, Sheridan, Wilson, Thomas, Long, Merritt, Croxton, Torbert, Gamble, Harrison, Devin, Kester, Syndhan, Alger, Wilder, Kilpatrick, Custer, Kidd, Gregg, Minty, Gerrard, and a host of others. Officially these soldiers were called the U. S. Cavalary, but there would be no traditional saber charges, just Spencer repeaters, and plenty of fighting on foot.

Eight-shooters in the hands of mounted infantry had the initial test June 24, 1863. The remarkable Colonel John T. Wilder, leader of the Michigan Lightning Brigade, repulsed a vastly superior Confederate force on a "Western" battlefield, Hoover's Gap, some 50 miles from Chattanooga. This was the same Wilder, a successful businessman in civilian life, before and after the war, who endorsed the individual notes of his beloved men so they could privately purchase Spencer repeaters directly from the factory with still unearned Army pay. Wilder's 4,000 made history at Hoover's Gap.

Six days later the new combination



BLAKESLEE CARTRIDGE BOX for Spencer rifles and carbines enabled soldiers to carry ten tubes of .50 caliber cartridges. With one tube already in the gun, this gave Union cavalrymen firepower totalling 80 shots before it was necessary to reload.

exerted its impact in the Eastern theater. A young captain in black velvet and fancy trimmings under Kilpatrick led his men into Hanover. The dismounted men operated around the railroad station. Their position was between J. E. B. Stuart's vaunted cavalry and the road to Gettysburg, where Lee impatiently awaited his indispensable unit which he called "the eyes and the ears of his army," Jeb's 10,000. For the second time in the war lightning struck the men in gray. A distinctive staccato of firepower rang out. The fancy young Federal Captain in command of the situation was George Armstrong Custer. A reversal for *Stuart* resulted in his long, horseshoe detour to Gettysburg to meet *Lee* after the vital battle was two days old. The salutation of the patient and mild-mannered Lee was, "Well, General Stuart, you are here at last."

Kilpatrick and Custer, having taken the direct road to the battle amphitheater, were already there and in action. The first day Buford's men, some with the Spencers, delayed the Confederate entry into Gettysburg until Meade could establish his "Fish Hook" defense. The second day Gregg's cavalry, some armed with the deadly repeater, successfully resisted General Ewell on the Federal right flank. The three-day battle ended when the massive Pickett's charge against the midsection was repulsed by the Federals. Stuart's Cavalry was defeated in a side-battle, in which he again had to contend with Spencer repeaters. That marked the first time many men in blue and in gray heard the new sound of multiple-fire—Spencer eight-shooters with ample ammunition in the critical areas. It marked the end of the beginning for the Federals, the opposite for the Confederates – that July 3, 1863. Unfortunately the only way to terminate the great ordeal between two segments of one people was the destruction of one army by the other. There would be almost two more years of carnage before Appomattox.

Custer, the last in his class of '61 at West Point, who, in one step, was promoted from Captain to General, later wrote the following: "I attribute their (5th Michigan) success to the fact that the regiment is armed with the Spencer repeating rifle, which in the hands of brave determined men is the most effective firearm that our cavalry can adopt." The only fight he ever lost was to the Indians of Crazy Horse at the battle of the Little Big Horn; and there his men were not armed with the repeater, the Ordnance Department having recalled them at the conclusion of the Civil War.

As the war progressed, the all-powerful little carbine was channeled in increasing quantity to the mounted infantry. Christopher Spencer held the patents on his weapon and manufactured it; however, other companies also produced Spencers on a royalty basis. The Confederates learned to respect and hate the classy little weapon, which they called the "machine rifle." Effort was made to pro-

duce a Southern version of it. There were occasions when the stepped-up tempo of rapidfire caused leaders in gray to misjudge the size of the enemy force. It not only caused the spilling of Southern blood, but it wrecked morale. This was most evident with the opponents of the Army of the Cumberland under the leadership of Wilson. Ultimately he had a complete army of mounted infantry armed with Spencers—50,000 strong.

Years later Kidd, in describing Pickett's charge at Gettysburg had this to say about the repeater, "Alger's men with their eight-shotted carbines, forced their adversaries slowly but surely back, the gray line fighting well and superior in numbers, but unable to withstand the storm of bullets."

"By the acceptance of the Spencer by the Government and the issuance of the carbine to the cavalry regiments, and the rifle to mounted infantry, the efficiency of these forces was immensely improved, and undoubtedly became a greater factor in bringing the war to a successful close," wrote Captain William B. Cary of the 5th New York Cavalry, who after the war became a minister.

It is understandable how historians of the past in their factual reporting and interpretations attached great significance to respective manpower and stratagems. Numbers involved coupled with field tactics is the common denominator applied to battle success and failure. Actually during the Civil War period, when rifles and cartridges were undergoing such a vast evolution, there was great variation in firepower, accuracy and range in the respective weapons of the adversaries. Well placed bullets caused casualties. Mechanical advantage was the crux of the matter. When one side only possessed multiple firepower, the balance scale of the fortunes of war was tipped. A hopeless situation would be engaging groups equal in number, one armed with a repeating rifled-barrel arm, and the other with the smoothbore muzzle-loader. This is the extreme in a lopsided contest of shooting to kill, but it is an exaggerated pattern of the last half of the war.

The intensive research of the part played in the Civil War by the Spencer spit-fire is a story in itself, and a recent one at that. J. O. Buckridge had occasion to do business with the rela-

PENNSYLVANIA RESERVES, some of whom fought within sight of their own homes, met McLaw's Confederate Division when it broke through the salient at the Peach Orchard on the afternoon of the second day. (From a painting done in 1881 by Peter Fredrick Rothermel.)

tives of Spencer, Richard D. Perry, Senior and Junior, of Ohio. They like to talk about their old boss and uncle, Christopher Spencer, who died in 1921, and his Civil War invention. The more Buckridge learned about this escaped history, the more fascinating and important he found the story. It deserved its place in the records. To him goes much of the credit for discovering this phase of Civil War history. Couple this newly uncovered data with the story of the development of the Federal mounted infantry by Pleasonton, Buford, and Wilder and one is able to place his finger on a vital factor in the War Between the States.

Buckridge terms the Spencer "an accident in history, a one-war gun," for after the cessation of hostilities few were manufactured and Christopher Spencer was busy placing into production a new invention which would hasten peace-time mass production. Discontinuation of the firearm and its special .50 caliber cartridge, and its recall after the conclusion of hostilities by the Ordnance Department did much to minimize and hide its significance and reputation. His best estimate of the number used in the war was approximately 200,000. It appears that there were approximately 500 of the waterproof brass cartridges made for every gun produced.

During the course of the war some of the States purchased Spencers for their militia, and individual soldiers bought the rifle direct from the factory. Incomplete Army Ordnance records alone show the following purchases:

Spencer carbines	94,196	@ $22,393,633.82
Spencer rifles	12,471	@ $ 467,390.56
Brass cartridges	58,238,924	@ $ 1,419,277.66

In addition, there were 1,731 Henry repeating rifles for which the Ordnance Department paid $63,953.26. Henry's delicate sixteen-shooter followed Spencer's sturdy force of destruction by about one year. Except for several arms which utilized metal cartridges, this was a paper-cartridge and powder-horn war.

Some students regard the turning point of the Civil War as being the afternoon of July 3, 1863. Pickett's spectacular charge was not quite sufficient to carry beyond two narrow strips of gently-sloping Cemetery Ridge on the outskirts of Gettysburg. The Confederates were repulsed, but not beaten; they walked off the field. Others regard May 11, 1864, the Battle of Yellow Tavern, as the crisis, basing this judgment on the fact that henceforth the Armies of the Confederacy were relegated to the defensive, giving ground in battle on Southern soil.

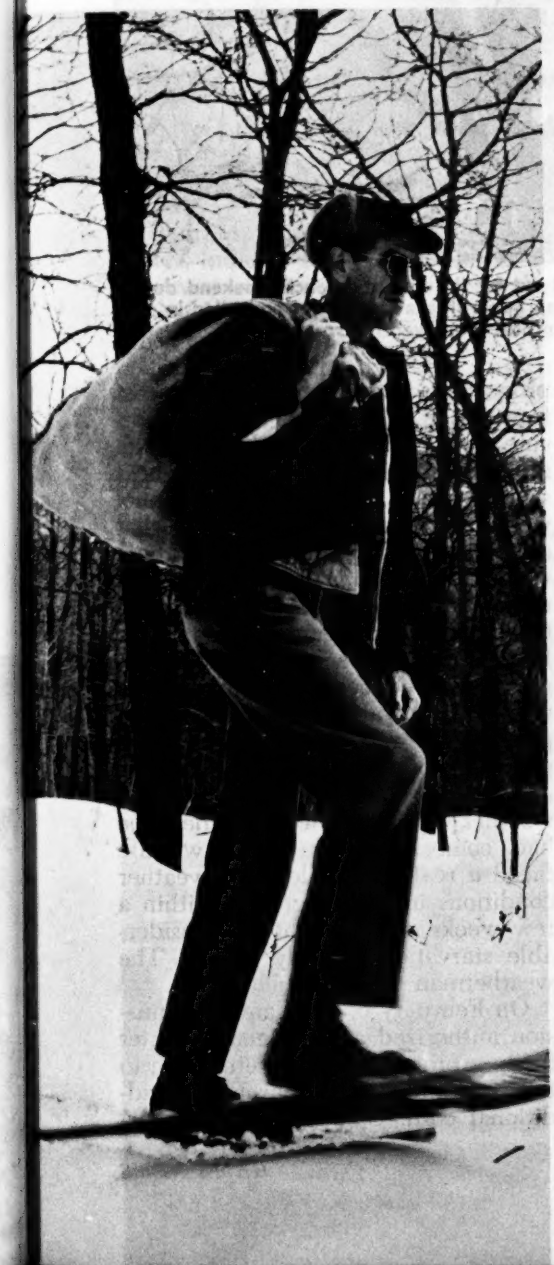
In the light of recent research it would appear that the fundamental factor, the special advantage in the fortunes of war, was the Pleasonton-Buford-Wilder conception of mounted infantry armed with the repeating carbine, the invention of Christopher Spencer. Battle sites, respective manpower, leadership and maneuvers mattered less, once this perfect Civil War combination of firepower and mobility was set into operation in two distantly removed arenae that last week of June in the summer of 1863.

CHARLES K. FOX is Editor, The Stackpole Company, Harrisburg. He is the author of many articles and papers on outdoor sport, is widely known for his ability as an angler and for his knowledge of fishing. But like many Pennsylvanians, he has taken special interest in the Civil War and has done intensive research into little-known sidelights of this epic struggle in American freedom.

A Look Back on Wildlife and The Worst Weather on Record...

A Winter to Remember

By Robert D. Reed
Wildlife Information Specialist
Pennsylvania Game Commission



IT WAS late in coming. Pennsylvania sportsmen were hunting bear on November 28 in shirt-sleeve weather and even early in the deer season hunters had little need for thermal underwear or insulated boots. The woods were dry, the sun warm and the waterfowlers were still praying for wet, cold sunrises.

By the second week of the deer season, some snow did blanket most of the state, especially in the northern tier counties and by mid-December, Pennsylvanians were no longer dreaming of a white Christmas. It was here. Even the January thaw failed to make much of a dent in the white landscape. Snow storm followed snow storm with monotonous regularity and temperatures got low and lower, breaking all-time records for this part of the country. Looking back, never before did more than 70 inches of snow fall on many areas of the Keystone State in any single year. This was a winter that re-wrote the record books—one that made us begin to believe in the winters like Grandpa talked about—one that can be described to our grandchildren in terms that they probably won't believe either.

It was more than that, however. It was a winter that once again proved the universal appeal of wildlife to modern day Americans. The desire to

SNOWSHOES AND STRONG BACKS were essential to Pennsylvania Game Protectors in the performance of emergency duties this winter. Here Game Protector Gene Utech carries corn to remote feeders in Cumberland County during mid-February.

ARMSTRONG COUNTY SPORTSMEN turned out by the hundreds each weekend during the emergency. More than 30 areas of wild crab apple thickets were cut and piled in such a manner as to provide food for rabbits and protective cover for small game.

help deer, wild turkeys and small game spread far beyond the ranks of sportsmen—it reached into the hearts of housewives, businessmen and a host of citizens who ordinarily would not have been much concerned.

On January 17, Game Commission field officers in the northern tier counties reported that hundreds of turkey feeders were in operation, the physical condition of all wildlife was "good" and no serious problems had developed so far. Though snow in the northern mountains was a foot or more in depth, only in the northeast was crusting reported. Deer and turkeys could still dig through the snow to reach food on the ground and some bare spots were still reported on a few southern slopes. On January 26, the physical condition of wild birds and animals had not changed materially, field officers still reporting deer and turkeys were surviving the deepening snows and low temperatures.

But by early February, public concern for wildlife had reached major proportions and an extended forecast from the U. S. Weather Bureau indicated there would be no let-up in the severe conditions for at least the next several weeks. Commission personnel were faced with the realization that any prolonged duration of these weather conditions might cause unusual suffering and hardship for deer, turkey and other game. Fortunately, Pennsylvania's deer management program had reduced the deer herd in most areas to about the carrying capacity of the range and wildlife biologists have proved that most wild birds and animals can survive severe winter weather for many weeks. The time had come, however, when wildlife faced a real test. Unless the weather conditions improved greatly within a few weeks, there might be considerable starvation in early March. The weatherman gave no such hope.

On February 6, the Game Commission authorized an emergency winter feeding program. Steps were taken to transfer funds for the purchase of additional corn. Game Farms were or-

dered to make all equipment available to the field force and the Commission's Food and Cover Corps was placed on a 7-day work week. Salaried officers were already on continuous duty, working long hours every day to meet the need. It was emphasized, however, that these were temporary measures designed to meet an unusual emergency, especially in areas when and where winter kill of wildlife was imminent.

But then, almost as suddenly as it had come, the winter of 1960-61 began to break up. Temperatures rose, the snows of late February turned to rain and by early March the worst was over. On March 1, the Commission's Executive Director M. J. Golden reported:

"Current reports from the Field Divisions indicate that the winter kill of deer was not as serious as generally believed. Obviously, we cannot at this time make a complete analysis of losses. A preliminary report of known deer losses covering the month of February from all counties shows that there were more known kills resulting from dogs and the combination of highway vehicles and railroad trains than there were known losses of winter-killed deer.

"The most serious losses of winter-killed deer have occurred on large private holdings where public hunting is not permitted and where the Commission cannot manage the deer herd. On many of these areas deer are too numerous in relation to the poor range conditions and food supply; little or nothing has been done by those in control of these areas to correct this situation.

"For certain individuals, the winter loss occurring under these non-typical range conditions was assumed to be an index of state-wide mortality. This assumption was not valid. There is no question about the fact that some deer were lost this winter but thanks to intelligent herd management and periodic antlerless deer harvests, statewide losses were not alarming and probably will not exceed those of last winter. Even during average winters some deer die. Mortality will naturally be higher during severe winters but regardless of the severity of the weather, greatest losses will continue

ISABELLA ROD AND GUN CLUB members and cooperating sportsmen in Fayette County distributed tons of corn in the Luzerne Township area. Officers of the Isabella club include Joe Coleman, president; Frank Orbash, vice president; James Rable, secretary; and Paul Bohna, treasurer.

to occur on large private land holdings where the herd is virtually unharvested."

Winter starvation in the Pennsylvania deer herd is not a new phenomenon. In 1927, Vernon Bailey, Chief Field Naturalist for the old U. S. Bureau of Biological Survey, was called into Pennsylvania to determine the cause or causes of a large-scale winter die-off. Following a study in the central and northcentral portions of the Commonwealth, Bailey found much of the timberland overstocked with deer. He concluded that only a reduction in the size of the herd would bring relief to a seriously depleted range.

DEAD DEER during February were the cause of great public concern but Commission field officers reported many of the yearlings found were killed by dogs. Cumberland County Game Protector Gene Utech holds a fawn that was literally torn apart by stray dogs in the South Mountains area.

In 1923, the Game Commission was given authority by the Legislature to declare antlerless deer seasons. For years injunctions by various counties and the right to abrogate antlerless seasons thwarted the Commission attempts to harvest the surplus animals and thus bring the herd into balance with its natural food supply. As a result tens of thousands of animals were needlessly wasted to starvation.

In 1951 the Legislature eliminated the right of a county to abrogate antlerless deer seasons. This Legislative action enabled the Game Commission to embark on a long-range deer management program. Periodic antlerless deer seasons, predicated on range conditions and the supply of natural food, have enabled Pennsylvania to maintain its reputation as a top-notch deer hunting state. In addition, needless waste through excessive winter mortality has been minimized.

During the past winter, a preliminary estimate of winter mortality in the deer herd state-wide was 3,000-4,000. During the 1959-60 winter, the estimated loss was 4,000, while two years ago the figure was set at 1,000. This year the Commission's Northcentral Division, covering 10 counties where deep snows and low temperatures are normal in every winter, reported that the number of deer lost last January and February was below the loss of the previous year.

Following the 1960 antlerless deer season, all Field Divisions proceeded with normal game feeding activities.

STARVED DEER were found in some areas where natural food conditions were not sufficient to hold the winter herd. This dead deer was located along the East Branch of First Fork, Sinnemahoning Creek, Potter County.

By February 3, 1961—68,115 bushels of ear corn had been placed in established feeders for turkeys and other small game. From February 3 to March 1, field divisions purchased and fed 116,249 additional bushels of corn.

Commission employes cut 2,640 acres of browse for deer during the fall and winter prior to February 1, 1961. Despite the deep snow, difficulty of travel and other duties imposed by the emergency feeding program, the crews cut 850 acres during February.

The magnitude of the combined efforts to minimize winter losses of game is also indicated by the miles of roads plowed open. Some of this mileage was plowed open two or three times. About 1,725 miles of roads were cleared with Commission and cooperating agency equipment and an additional 1,007 miles were opened by individuals, industries and utilities.

In summing up a "winter to remember," Golden stated, "We publicly recommend all Game Commission personnel who devoted long hours under the most trying conditions in a supreme effort to save our wildlife. We especially want to thank the organized sportsmen and the many agencies, individuals and industries who contributed so generously of energy, equipment, feed, time and money to make the emergency game feeding program a success. We also wish to thank the press, radio, television and other news media for the splendid coverage they gave this program. We are genuinely grateful to all who helped."

WALKIN' SHOES

By NED SMITH

A Challenge to Bird Watchers

1. Do songbirds hybridize?
2. What predominantly yellow and olive warbler has a distinctive reddish-brown patch on the side of the head?
3. Which of two similarly colored birds, the Connecticut warbler and the mourning warbler, has a white eye-ring?
4. Where does the blue-winged warbler nest — in deep forests or brushy lowlands?
5. The Brewster's warbler and the Lawrence's warbler are both offspring of a blue-winged, golden-winged warbler mating. Which is the rarer?
6. What yellow and olive green warbler wears a round, black cap?
7. The prothonotary warbler is quite rare in most of Pennsylvania. Are we north or south of the center of its range?
8. The yellow-throated warbler is primarily a southern bird. True or false?

WHAT sort of people are bird watchers? Well, according to popular notion they are either old maids who have grown tired of crocheting or effeminate little men who need something to feel physically superior to. That conception isn't borne out by the facts, however. People of all types and temperaments, all ages, and all professions are interested in birds. Some of the most rugged, rough-and-ready hunters and trappers I know are inveterate bird watchers, and pioneer American ornithologists of Audubon's ilk were self-sufficient men to whom hardship and peril were a part of everyday life.

The uninitiated often wonder what makes bird watching so all-fired intriguing. That's a tough one to put your finger on. Of course, wild creatures have always held a certain amount of fascination for humans. Birds have always been especially appealing because, I suppose, of the many varieties, the innumerable hues and patterns of their plumage, their interesting habits, and the readiness with which some species respond to human friendship.

But if asked what one thing was most responsible for maintaining interest in the study of birds I'd be tempted to say *uncertainty*. The unexpected thrill of suddenly seeing a new or rare species, or the mere anticipation of making such a discovery is what gives the hobby much of its appeal.

It is the hope of just such an event that lures bird enthusiasts by the thousands into field and woodland each May. Hordes of birds of many kinds are moving northward during that month, but the wood warblers provide most of the action and attract

most of the attention. Even the familiar species are a delight to see, for most of them are exquisitely colored, merry little creatures. But in the mind of every bird watcher burns the hope of finding a rare one among them.

Here are some to look for. Of the twelve warblers described in this article only a few could be considered even fairly common throughout most of Pennsylvania. Several more are reasonably abundant in certain restricted parts of the state but very rare in others, and one or two are quite rare *anywhere* in Pennsylvania.

Of particular interest are the hybrids produced by the interbreeding of the golden-winged and blue-winged warblers. All first generation hybrids resulting from this mating are Brewster's warblers, birds with predominately white underparts. Second generation offspring will consist of pure golden-wings, blue-wings, Brewster's and Lawrence's warblers, in addition to mixtures of all but the latter. The Lawrence's warbler, a bird with predominantly yellow underparts, is the recessive form and therefore much rarer than the others. It is, in fact, a find in any part of its range.

Hybridization is apparently not confined to these warblers. The Sutton's warbler, of which only a few specimens have been collected, is thought to be a cross between the yellow-throated warbler and the parula warbler. Such examples of interbreeding are extremely rare, but the fact that they do occur holds out hope for the amateur ornithologist of some day meeting up with one of these prizes.

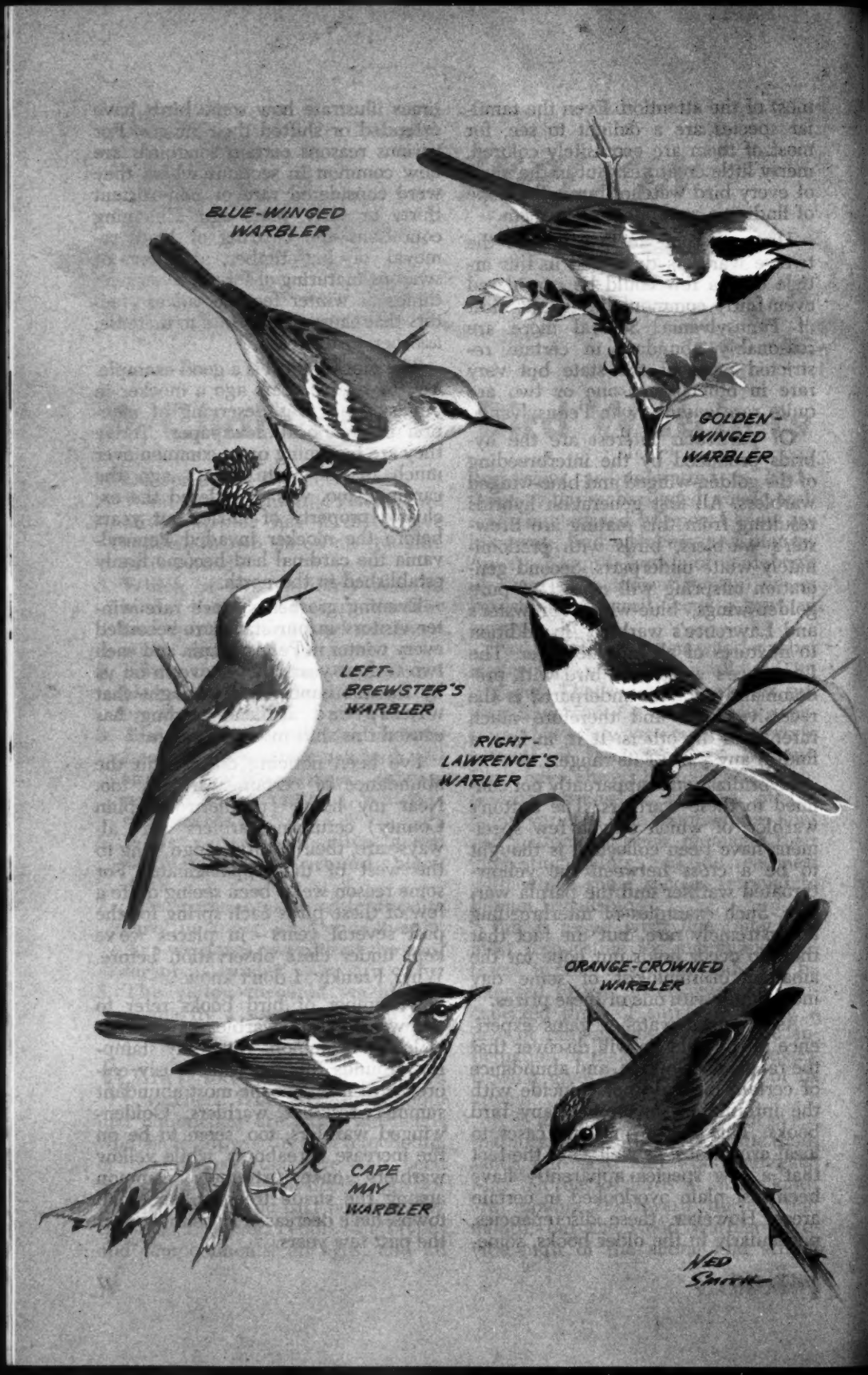
As the bird watcher gains experience in the field he will discover that the range, distribution, and abundance of certain birds do not coincide with the information given in many bird books. This is due in some cases to local exceptions, as well as to the fact that a few species apparently have been just plain overlooked in certain areas. However, these discrepancies, particularly in the older books, sometimes illustrate how some birds have extended or shifted their ranges. For various reasons certain songbirds are now common in sections where they were considered rare or non-existent thirty or forty years ago. Changing conditions—the clearing of land, removal of big timber, draining of swamps, maturing of forests, even such things as winter feeding—all are factors that cause one species to increase, another to decrease.

The mockingbird is a good example. Ten or twelve years ago a mocker in Pennsylvania was deserving of mention in the local newspaper. Today they are becoming quite common over much of the state. Years ago the cardinal, too, was considered the exclusive property of Dixie, but years before the mocker invaded Pennsylvania the cardinal had become firmly established in the north.

Evening grosbeaks, once rare winter visitors in our state, are recorded every winter in Pennsylvania and each two to four years they move in on us by the thousands. It is thought that widespread artificial feeding has caused this shift in winter range.

I've been noticing changes in the abundance of certain warblers, too. Near my home (northern Dauphin County) cerulean warblers were always rare, their natural range lying to the west of the Appalachians. For some reason we've been seeing quite a few of these birds each spring for the past several years – in places we've kept under close observation before. Why? Frankly, I don't know.

A number of bird books refer to the worm-eating warbler as rare, or at least uncommon. Yet in my stamping grounds this inconspicuously colored bird is one of the most abundant summer resident warblers. Golden-winged warblers, too, seem to be on the increase hereabouts, while yellow warblers, once extremely common among the shade trees of our small towns, have decreased alarmingly over the past few years.


BLUE-WINGED WARBLER
GOLDEN-WINGED WARBLER
LEFT-BREWSTER'S WARBLER
RIGHT-LAWRENCE'S WARLER
ORANGE-CROWNED WARBLER
CAPE MAY WARBLER
NED SMITH

These constantly changing populations are puzzling, to say the least, and in the case of decreasing numbers are downright distressing. Nevertheless, they do provide that element so essential for the enjoyment of bird watching – uncertainty. Without it thousands of Pennsylvanians would hang up their binoculars and spend May's greening days television watching rather than bird watching.

Blue-Winged Warbler—A denizen of damp, brushy places this locally common warbler's buzzy song is often the first indication of its presence—"Bee-buzzz," a two-parted utterance with an inhale, exhale effect.

On sighting the bird we find he is quite yellow—forehead, sides of head, and underparts. The back of the head and neck as well as the back are olive, brighter on the rump. The wings and tail are gray, the former crossed by two white bars. A narrow black line runs through the eye. The female is similar, but duller.

The blue-wing nests in Pennsylvania, building a deep nest of grasses, leaves, and bark on or near the ground in low, overgrown meadows or brushy swamps.

Golden-Winged Warbler — Old fields overgrown or bordered with black locust trees seem to be particularly favored by the boldly-patterned little golden-wing. Here he flits from tree to tree, giving his double-toned "bee-buz-buz-buz" song.

His upperparts are gray, with a clear yellow crown patch and a wing patch of the same color. The underparts and a stripe over the eye are white. A patch on the side of the face and one on the chin and throat are boldly black. The female is similar, but the black is replaced with gray.

The golden-wing nests in Pennsylvania, usually in brushy upland edges. Built on a base of leaves and supported by a cluster of coarse weeds, grass, or brush, the nest consists chiefly of grasses, usually reinforced with grapevine bark.

Brewster's Warbler — Interbreeding among songbirds is quite rare, but blue-winged warblers and golden-winged warblers frequently hybridize. The Brewster's warbler is the more common hybrid produced by these two, the Lawrence warbler the rarer form, although both are decidedly uncommon. A typical Brewster has gray upperparts, a yellow forehead, a narrow black line through the eye, a yellow wing patch, and white underparts. Often the breast is tinged with yellow. The song is usually similar to that of either parent, although it is sometimes a distinctively different song.

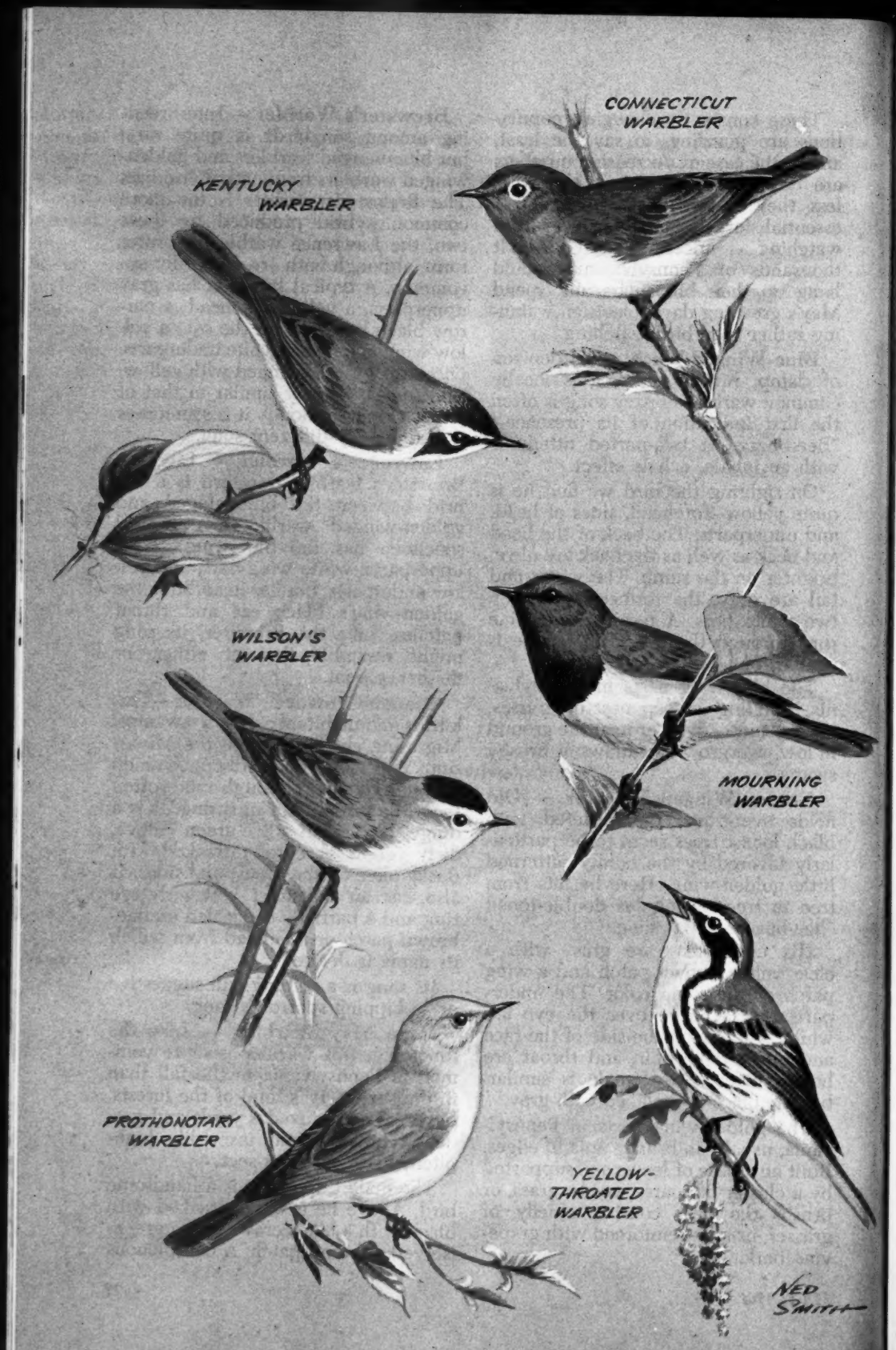
Lawrence's Warbler — Like the Brewster's warbler this bird is a hybrid between the blue-winged and golden-winged warblers. A typical specimen has the blue-wing's olive upperparts, white wing-bars, and yellow underparts, but has in addition the golden-wing's black ear and throat patches. Like the Brewster, its song might resemble that of either, or neither, parent.

Orange-Crowned Warbler—This bird is an inhabitant of brushy swamps. Migrating chiefly through the Mississippi Valley, it is decidedly uncommon in Pennsylvania, although more often seen in autumn than in spring. It is a dingy bird, dull olive-green above, dirty yellow obscurely streaked with dusky olive on the breast and sides. It also has an indistinct yellowish eye ring and a partially concealed orange-brown patch on the head from which its name is derived.

Its song is a rattling trill suggestive of a chipping sparrow's song.

Cape May Warbler — Like the foregoing, this warbler is more common in Pennsylvania in the fall than in the spring. It is fond of the forests, but frequently invades yards and gardens. The song is an insect-like high-pitched seet-seet-seet-seet.

The male Cape May is a handsome bird. Above he is olive streaked with black, with a black crown and a greenish-yellow rump patch. A conspicuous


CONNECTICUT WARBLER
KENTUCKY WARBLER
WILSON'S WARBLER
MOURNING WARBLER
PROTHONOTARY WARBLER
YELLOW-THROATED WARBLER
NED SMITH

white patch marks the wing. The underparts, sides of the neck, and a line above and in front of the eye are bright yellow. There is a reddish-brown patch on the side of the head—the only warbler so marked—and the underparts are boldly streaked with black.

The female is much duller and lacks the rusty face patch.

Kentucky Warbler — This bird is found chiefly in the South. It nests in southern Pennsylvania, particularly in the southwest, but elsewhere in the state is rare to uncommon. Look for it in thickly wooded hollows and ravines. Its song, a rolling turdle, turdle, turdle, is quite distinctive.

The bird itself is olive above, yellow beneath. The forehead and a patch on the side of the face are black. The partial eye-ring and a stripe joining it and the bill are yellow. The crown feathers are tipped with gray. In the female the colors are duller, with gray taking the place of the male's black facial markings.

Connecticut Warbler — Unfortunately this cute fellow is far from common in Pennsylvania. It is olive-green above with yellow underparts. The head, neck and breast are ashy gray, with a complete white eye-ring that gives it an alert, wide-eyed look. The crown and nape are olive. The female is similar but the sides of the head are olive, the throat and breast paler and the eye-ring less distinct. This warbler prefers weeds and brush to high trees and bare woodlands.

Mourning Warbler — This pretty warbler resembles the Connecticut warbler but has a black patch on the breast and throat and lacks the eye-ring. The gray of the female is paler and the black is replaced by gray. One of our rarer migrants, it is most often seen in weedy or brushy lowlands.

Wilson's Warbler — You couldn't mistake this sprightly fellow for any other bird if you tried. No other olive and yellow warbler wears a natty black beret. The female is a plain olive and yellow bird, sometimes with a trace of a black cap. She can be distinguished from the female hooded warbler by the white spots on the inner vanes of the latter's outer tail feathers. The Wilson's warbler is an accomplished fly catcher, snapping up many of its meals on the wing.

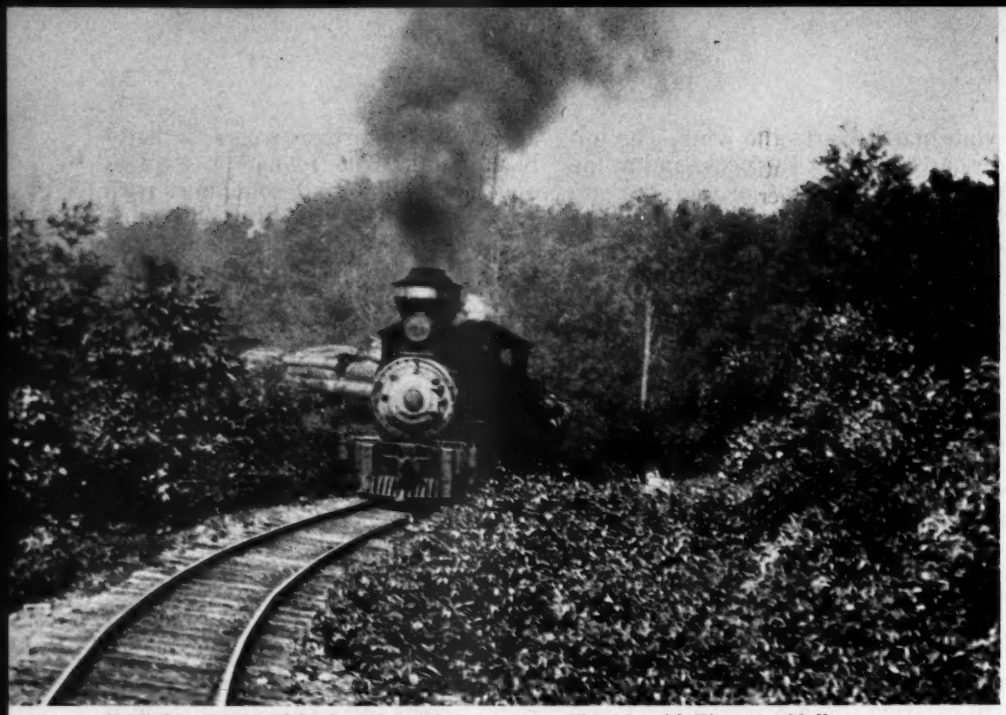
Prothonotary Warbler—Here's a rare one for Pennsylvania bird watchers. It is primarily a bird of the southern swamps but has been recorded from the southern part of our state. Its song is a ringing peet-tweet-tweet-tweet.

The male's head and underparts are a rich orange-yellow, lighter on the belly. On the back the yellow blends into green, then to blue-gray on the rump, wings, and tail. The female is similar, but duller.

Yellow-throated Warbler — Another common bird in the forests of the south, this bird has been observed in southern Pennsylvania. Its upperparts are primarily gray—the wing and tail feathers chiefly black edged in gray. A yellow bib covers the throat and center of the breast. The sides of the head and neck are strongly patterned with black and white and the underparts are white streaked with black. Two white bars cross each wing. The yellow-throated warbler is a bird of the treetops and his ringing chew, chew, chew, chew-ee is often heard from high in the leafy canopy.

ANSWERS TO QUESTIONS

1. **Yes, although it is not a common occurrence.**
2. **The Cape May warbler.**
3. **The Connecticut warbler.**
4. **Brushy lowlands.**
5. **The Lawrence's warbler.**
6. **The Wilson's warbler.**
7. **North.**
8. **True.**



OUT OF THE WOODS and headed to the mill, this old Tionesta Valley narrow gauge log train steams around a bend.

The Saga of C.P.L. and Pennsylvania's Big Timber...

Great Ghost

By Tom Curtin

MANY a hunter who has invaded the forests of Warren, McKean, Elk, Forest, and other nearby counties has at one time or another devoted some thought to the remains of the gigantic tree stumps that are found in that area along with abandoned railroad right-of-ways. These are the only reminders left of the days when timber was "king" in that region. A time when in the town of Sheffield, Pa., stood the largest sawmill east of the Mississippi—the Central Pennsylvania Lumber Company.

The company was founded in 1903, mostly through the influence of the wealthy Horton family, who attained this wealth in the tanning business. Until the year of 1931, the offices of the company were situated at Williamsport, Pa., but were then transferred to Sheffield. At different times throughout the life of the company, they operated mills at Grays Run, Williamsport, Lanquin, Galeton, Kinzua, Jameson City, Leetonia, Mina, Costello, Tiadaghton, Masten, Loleta, and Sheffield.

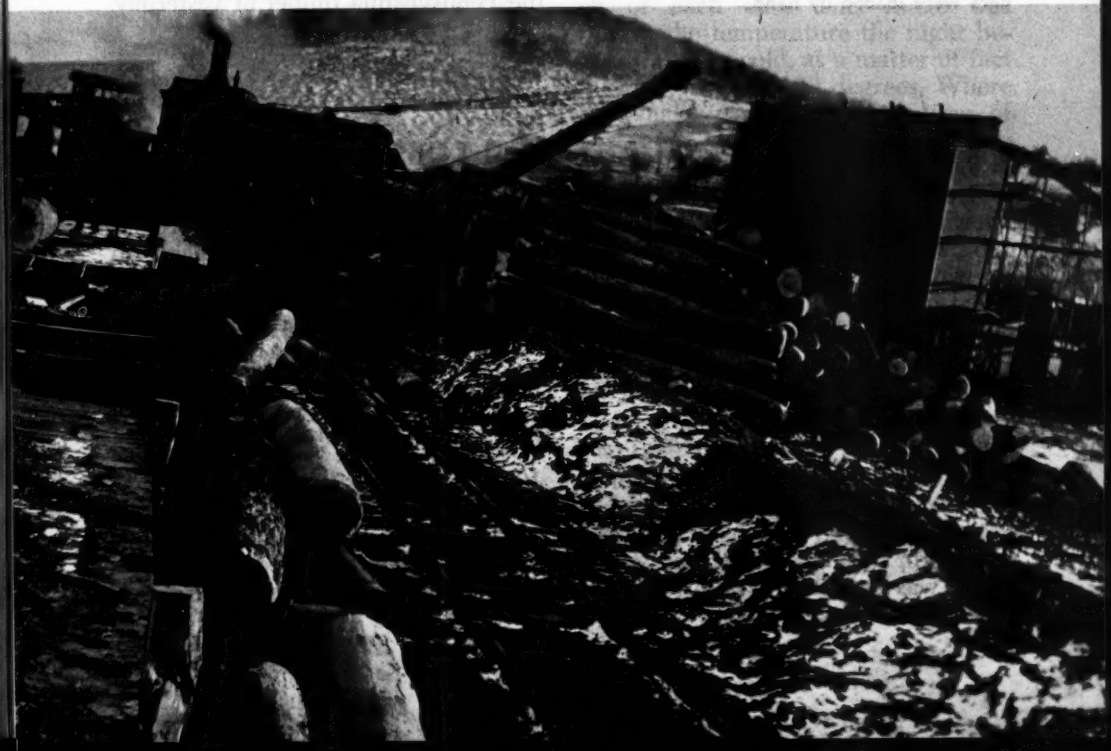
In the early days lumber was of second importance. The felling of hemlock trees for their bark, which was used in tanning, was of prime interest until about 1908. With the increasing importance of lumber about that time, Sheffield was made the center of operations for one of the largest

steam and electrically powered band-saw mills in the nation. The mill was built largely of concrete and steel concentrated in durable quantities. Once in operation, the mill flourished with activity twenty-four hours a day, and it was soon surrounded by vast yards of logs and sawed lumber. According to Bruce Smith's "HISTORICAL COLLECTIONS OF SHEFFIELD TOWNSHIP," the mill boasted a daily average of 130,000 board feet in eight to ten hours. This would be approximately enough lumber to construct thirteen houses, each capable of housing five people comfortably. An all-time record of 337,074 board feet was sawed in a ten-hour period on March 14, 1923.

Until 1920, the mill sawed into lumber all logs cut in this section, including both hemlock and hardwoods. During September of that year a mill was installed solely for the purpose of sawing the hardwoods. The hardwood mill operated until 1930 when it was finally abandoned and dis-

NUMBER NINETEEN, a Heissler engine made in Erie, was almost brand new when this picture was taken. It was typical of the many narrow gauge railroad engines used around Sheffield when the log-boom was on.

C.P.L. YARD on a cold January day of 1920. Here the logs were unloaded for the hardwood mill. These old photos were made from negatives owned by Robert Newman. They were taken by his father, Gust Newman, when he worked for the Tionesta Valley Railroad.



RAILROAD YARD near the mill was a busy place. The log trains usually made two trips a day to the major log camps where the cars were loaded by hand.

mantled. Once again the hemlock mill was employed to cut both kinds of timber. But the years of the great C.P.L. were numbered. Man's careless logging methods were bringing about an end to the forests of uncut timber and production began to dwindle. On July 3, 1941, the last log ever to be sawed at the great mill was processed, thus bringing an end to one of the greatest mills in the United States. Along with the death of "big timber days," came the end of many of the narrow-gauge railroads that wound through the hills of Pennsylvania, and a whole saga was completed in early railroad history.

The land and timber holdings of the C.P.L. have listed as high as 400,000 acres, which since 1921 mostly have been absorbed into the holdings of the Allegheny National Forest and are all part of a great reforestation program. In 1934 the Forest made an important purchase from the C.P.L. This was of 4,341 acres of virgin timber at the head of Cherry Run near Sheffield. Since then the Forest has built roads into this area, and has preserved it so that we and our posterity may be able to catch a last glimpse of the Pennsylvania timber of yesterday.

FEBRUARY DEER LOSS

Every month, each District Game Protector submits a report showing the known deer loss in his district. A compilation of these reports for February, 1961, showed a total of 1,335 recorded deer deaths in Pennsylvania other than by winter kill. (Preliminary figures on the losses including 452 known winter killed deer were released previously.) The causes of last month's deer mortalities, with a comparison of the known February, 1960, losses are as follows:

February	*Crop Damage*	*Vehicles*	*Illegally Killed*	*Miscellaneous*	*(Dogs)*	*Totals*
1961	15	599	66	655	(516)	1,135
1960	4	254	21	80	(62)	359

The increased losses during February, 1961, can be attributed to snow conditions which made deer extremely vulnerable to dogs and to vehicles and trains on plowed-out roads and tracks. Also, human opportunists took advantage of food placed for deer and illegally killed deer attracted to the food which was intended to help the animals through the critical period.

First Choice

WAYNE COUNTY – Three areas were cut for browse in the vicinity of Equinunk, which has a heavy winter deer population. After cutting, a shelter was constructed in each cutting and corn was placed in the shelters. After a week, I checked the area and found that the deer had browsed the cuttings heavily but had not utilized the corn to any great extent. Again this was the case where alfalfa was placed in the vicinity of recently cut browse. District Game Protector Frederick G. Weigelt, Honesdale.

Pencil Shooter

McKEAN COUNTY – This story was related to me. It seems that a hunter was driving down the Chapple Fork Road on the first day of bear season. After going a couple miles, a large bear went across the road. The hunter stopped, jumped out, proceeded to load his gun with a short mechanical pencil he had in his pocket. As the story goes, the bear lived to be hunted another day.–District Game Protector Guy W. Waldman, Mt. Jewett.

Redhead vs. Copperhead

BLAIR COUNTY–On the second day of February of this year, I had received a call that some illegal hunting had been going on in Antis Township in the vicinity of the Tipton reservoir. I decided to walk around on snowshoes and see if there were any signs or any dead deer. The first thing that I saw was a set of fox tracks. These were made by a large red male fox and I decided to follow them, figuring that they would lead me to any dead deer in the vicinity. After following them along the edge of the lake for a while, I noticed a place where it looked like he had been playing, and there was something that looked like a piece of rope lying on top of the snow. Investigation proved this not to be rope but a piece of a copperhead snake that the fox had dug up from some place. He had eaten about half of it, some off of each end. This snake was frozen, the temperature the night before was very cold, as a matter of fact it was down near 30 degrees. Where this snake came from this time of year and what happened to the fox after he had eaten the head will, I suppose, always remain a mystery.–District Game Protector Russell Meyer, Altoona.

Highway Multiplication

WESTMORELAND COUNTY–On February 6, 1961, Deputy Baker picked up three road killed deer off Route 80. Two of these deer were females and an examination of these two deer showed that they each carried two embryos, three of them were females and one male. Altogether seven deer were lost due to this one accident. – District Game Protector Philip L. Young, Apollo.

Tracking the Trappers

BRADFORD COUNTY – On February 12, 1961, while checking beaver ponds for traps, it was interesting to note the fresh fox tracks on practically every dam. The foxes had followed the tracks left in the snow by the beaver trappers. I am wondering if these animals were following these tracks with hopes of finding a meal of some sort at the end of the trail or if they were just curious to find out what was going on at the pond.–District Game Protector Donald E. Watson, Wyalusing.

Winter Wonders

BEDFORD COUNTY–Many fantastic stories were told, retold and added to during our emergency winter feeding program. Reports that twenty deer starved one place, nine deer another and many other reports that were checked out were found untrue. One report started in a locker room of a local plant. Nine deer were found near Bedford starved. After being checked out it was found that this report was started just to worry certain individuals who were concerned about the deer herd. Another story was from a farmer (no name) who related this one to me. A friend of his found 22 deer standing all in one bunch. After trying to make the deer move he approached the deer and found they were all starved, dead and frozen in their tracks.–District Game Protector W. H. Shaffer, Bedford.

Honeysuckle Haven

FRANKLIN COUNTY–The honeysuckle, which is considered a pest by man, probably saved more game this past severe winter than man did with all his efforts. It was used for food and cover by the quail and undoubtedly saved many coveys. When the snow was deep it was the only cover available. It was used for cover by the pheasants and grouse. It was used as food and cover by the rabbits and on many farms was the only place rabbit tracks could be found. It was used as food by the deer. It also provided shelter and food for many small birds.–District Game Protector Edward Campbell, Fort Loudon.

Browse Is Best

CENTRE COUNTY–On February 19, 1961, members of the Outdoor Sportsmen Club and employes of Nittany Timberlands, Inc., put their hearts and muscles into what most of the local people feel is the best type of winter feeding–browse cutting.

A six acre plot was marked by personnel of the Department of Forests & Waters in the Bear Meadows sections of Harris Township, and this conservation minded group took it from there. Trees toppled, "timber" was shouted, people scurried from the path of falling trees, and comments were made about whether or not all of this work was worth it. The following Sunday, when we returned to finish the job, we found it was worth our efforts. Three deer were seen in the cut-over area, and signs of where deer had browsed were evident throughout the plot.

Further investigation from members of this group showed where deer had walked directly past piled corn to get to the freshly cut browse. For some reason, the working output of every man doubled, there was less shouting, less joking, but I'm sure everyone walked away happier than the previous Sunday.–District Game Protector Joseph L. Wiker, State College.

Suburban Whitetails

LACKAWANNA COUNTY – It is interesting to report that a large group of deer have wintered in an area no more than one mile from downtown Scranton. Immediately after the second major snow storm in December about 28 deer moved into Dickson City borough in the vicinity of Storrs colliery. This immediate area consists of about 100 acres of culm banks and adjacent brush patches of maple, aspen and staghorn sumac. Despite the closeness of civilization the deer persisted in staying in the area, attracted by the lush browse conditions.

A few of the deer that were killed by cars on the nearby highway were checked by this officer and found to be in excellent physical condition. Two does so killed were found to be carrying twin fawn embryos. This certainly indicates that where deer have good browse conditions, they can endure a very severe winter, such as the one we have just experienced.–District Game Protector John L. Altmiller, Scranton.

Charge of the Bear Brigade

SOMERSET COUNTY–Two Somerset County hunters had followed fresh tracks in the snow that led to a den on Laurel Mill Mountain. These hunters, posting themselves near the entrance, made some noise. Before long a large black bear head emerged from the entrance. One hunter had his sights zeroed on this head but did not shoot. The head disappeared back into the den. But within seconds a female bruin and her cubs came forth from the den with such a great burst of speed, surprising the two hunters that their aim was not true. So Mrs. Bear and cubs are still enjoying outdoor freedom. Why did he not shoot the bear in the head? He wanted to get it mounted and did not wish to damage the head.–District Game Protector James Burns, Jr., Central City.

Slow Boat to Sunshine

JUNIATA COUNTY – After the rough winter, we finally had a thaw and during this time I received a phone call from "Buzz" Carl Mingle of Mifflintown, R. D. 1. He was in the process of getting his boat out of the ice so it would not get swept downstream when he happened to glance out over the Juniata River. There on the turbulent water, in the middle of a chunk of floe ice stood a large ringneck rooster. Buzz shouted to his buddy to look and the ringneck simply squatted, like they do in the middle of a field trying to conceal himself as best he could. After the winter he went through I wouldn't mind heading South myself. "Buzz" remarked that maybe this ringneck got the urge to migrate but was just too lazy to fly.–District Game Protector Robert Shaffer, Mifflintown.

Brave Bruin

CLINTON COUNTY–In the latter part of December, a large black bear was seen by Piper test pilots off the Coudersport Pike, lying on top of the ground, apparently in hibernation without any type of shelter. The bear apparently did not move around as no tracks were visible in the snow. The pilots flew low enough to witness the bear moving its head as he watched their plane approaching. The bear has been in the same spot for approximately eight weeks–District Game Protector Ivan L. Dodd, Mill Hall.

Taste Tempter

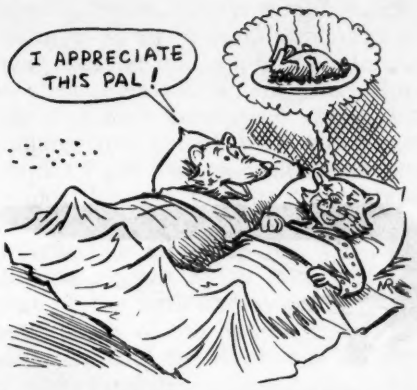
BUCKS COUNTY—One Bedminster Township farmer went all out feeding the pheasants and small birds on his place. Our Food and Cover Corps crew reports that this benefactor provided over a ton of small grain for the flock of nearly 100 pheasants on the farm. In addition, he had also put out large quantities of expensive cashew nuts to the pleasure of the squirrels and winter birds. One crew member admitted that he could hardly restrain himself from joining the other birds at the feeding station when he saw the tempting nuts on display.—District Game Protector William J. Lockett, Doylestown.

Woodchoppers' Ball

SCHUYLKILL COUNTY—During the recent winter feeding emergency, it was most gratifying to have 220 interested sportsmen turn out for a browse-cutting expedition on Game Lands No. 211, just south of Tower City. By working next to these men all day, we were able to explain various feeding problems and how we have been able to cope with this unusual situation. Contrary to many rumors, we did not find any starved deer. The most amusing feature about the entire program was the various cutting tools used during the operation. We saw everything from meat saws to Boy Scout hatchets. However, you never did see more spirit and enthusiasm on an extremely bad day. It snowed from morning until evening and many cars were stuck along the road. These men continued on foot so they could participate in the cutting.—Land Management Assistant Roy W. Trexler, Wyomissing.

Changing Times

PIKE COUNTY—During the critical period from about February 1 to February 23, I kept a constant watch on my number one game species of Pike County, namely Mr. Whitetail. This was nothing unusual, because the entire state was doing the same thing during the time when we had deep snows. I have been in this district for ten years and have seen a lot of changes that affect deer. First we have lost about 90 per cent of our sawmills. When a sawmill is in operation this means there will be more and better browse conditions. Next we have had a tremendous building program around our many lakes that cut out a lot of wildlife territory. I have seen clubs take up posted land, then when a doe season was declared, buy up the special licenses only to prevent others from having the chance, then not using the tag. I have seen large parties of hunters who really hunted, killing as many as 25 to 30 deer in the combined seasons. Yet in these same areas, these parties have continued to harvest a continual high number when the camp limit was removed. We lost some small deer this season and may still lose more that have had rough going during the snow. Still I have found that we have a lot of deer left. When the deep snow crusted, they served as stepladders. I see browse marks as high as I can reach and a deer did not get there standing on bare ground. Frozen streams, lakes and swamps also enabled deer to use the browse otherwise not available to them.—District Game Protector Albert J. Kriefski, Hawley.



Cold Companions

SOMERSET COUNTY – Received a call from a Somerset area man wanting to know if an opossum would kill his cat. This man had a box in his yard for the cat and during the extremely cold weather in February, he noticed that an opossum had moved in and taken up sleeping quarters with the cat.–District Game Protector Edward W. Cox, Somerset.

With Flying Colors

MONTGOMERY COUNTY – The ringneck pheasant once again proved to me why he is the No. 1 Game Bird of Pennsylvania. During January and February when Montgomery County and the rest of the state were buried under a blanket of snow the wily old ringneck pheasant took it on the chin and still came out of it with flying colors. I saw flocks of these birds get together and scratch down through 12 to 20 inches of snow in cornfields where they knew that there would be feed waiting for them. They found the sheltered hillsides that were blown partially clear of snow to feed and they found the fields where the farmers were spreading their manure. The Game Commission, sportsmen, farmers and other individuals did a wonderful job of winter feeding but it was still impossible to get to all the pheasants. Yet through it all the pheasants came out in wonderful shape. They have proved to me time and time again that they can get through floods, droughts, lean times and the heaviest hunting pressure that is imaginable but this time they proved that they can come through the extreme cold and snows like the proud birds that they are.–District Game Protector William Shaver, Harleysville.

Three Equals Six

PERRY COUNTY–One night in February I received a telephone call about a deer being hit on the highway. As I was leaving the house, I received a second call about the same deer. It was not one deer but three. When I arrived at the scene there lay three deer about fifty feet apart all hit by the same car and no car in sight. The party that hit the deer drove away. Three deer by one car was too many but until I was through dressing them out I had a total of six. I am sure the person never thought he was killing six.–District Game Protector Jacob Sitlinger, Newport.

Crow Call

ARMSTRONG COUNTY–Deputy Game Protector James Norton of West Kittanning received several complaints from the residents of Adrian, R. D., in the vicinity of Tarrtown concerning a "pet crow" attempting to remove mail from mail boxes. Maybe he is looking for a letter from the Game Commission answering his complaint about the Armstrong County Conservation League Crow Shooting Contest. – District Game Protector Dean M. Crooks, Kittanning.

A Potent Weapon Against Insects
But a Growing Threat to Wildlife...

Pesticides—Blessing or Curse?

By Ira N. Gabrielson

ONE of the more alarming elements of agricultural progress since the end of World War II from the standpoint of the wildlife administrator has been the phenomenal growth in number, potency, and in use of chemical pesticides. Before the last world-wide conflict, agricultural pesticides were relatively simple, safe to use, and applied too sparingly to present more than local threats to fish and wildlife resources. The most lethal substances commonly employed were some of the arsenic derivatives, which here and there were responsible for the loss of desirable fish and game where deer or rabbits foraged upon treated foliage or when rains washed the substances into streams or lakes.

Since the war, however, there have been four major developments that have caused increasing alarm among those interested in wildlife. First in importance was the development of the chlorinated hydrocarbon insecticides, with DDT as a comparatively feeble progenitor of a powerful new family of chemicals to which already has been added a second new family of equally potent organic phosphates. Practically all of these new chemicals are toxic to wildlife and fish; some retain their toxicity for months and years in soil or water; and even normal "safe" doses can be built up to lethal levels by repeated spraying of the same area.

The second postwar development was the increase in the production of crop spraying aircraft, an outgrowth of the reconnaissance and strafing aircraft of the war; and third was the discharge of thousands of war-trained pilots skilled in the operation of such

IRA N. GABRIELSON has had a long and varied career in wildlife conservation. He is recognized as one of this country's most able administrators, has authored many books and articles, and is presently serving as President, Wildlife Management Institute, Washington, D.C. This article is based on a paper presented to the 1958 Convention of the International Association of Game, Fish and Conservation Commissioners.

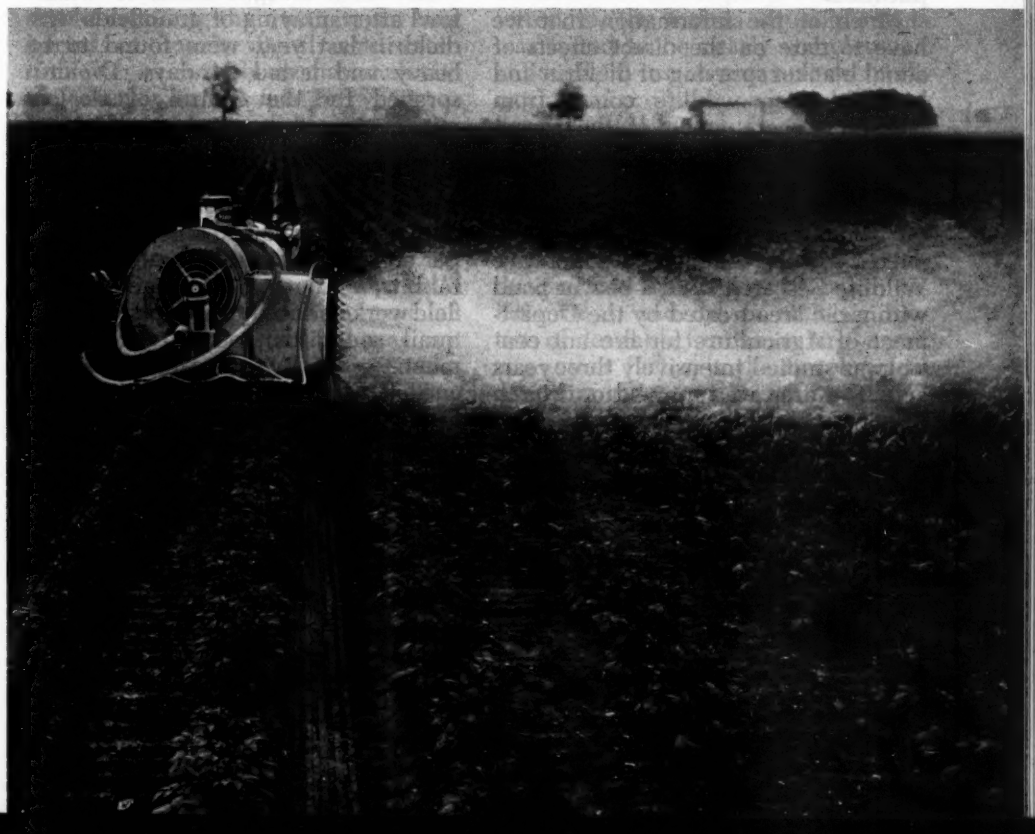
aircraft. It was only natural for many of these young men to capitalize on their training and apply their talents to agricultural aerial spraying. Hundreds of such enterprises sprang up, ranging from a single pilot with a war-surplus Piper Cub offering his services to local farmers, to large corporations with entire fleets of aircraft especially designed for crop spraying. The crop-dusting aircraft today is as much a part of the agricultural scene in the cottonfields of the Southeast and the wheatlands of the West as is the tractor and combine.

A fourth development has been the entrance of governmental agencies into the insect control picture on a broad scale. Regional control programs in cooperation with the states have been carried on for many years by the Department of Agriculture for the control of gypsy moths and other insect pests, but this activity has been increased and expanded within recent years. The most recent extension has been the familiar but still unassessed and alarming attack on the imported fire ant in the Southeast.

As a result of these developments, the broadcast use of chemicals, more powerful and potentially more dangerous than any ever used before, has increased phenomenally. In 1957 130 million pounds of the chlorinated carbons alone were broadcast on the croplands and forests of America. Production of insecticides has increased sevenfold since 1942, and the chemical industry is continuing to expand its annual production of these toxicants.

Even though these chemicals may be a most effective method of attacking insect pests and protecting the farmer against crop damage, the vacationist against insect stings, and the timber crop against borers and weevils, what are the indirect biological costs to the public? What will be the

MILLIONS OF POUNDS of the chlorinated carbons are being broadcast on the croplands and forests of America each year. Production of insecticides has increased more than sevenfold since 1942.



long-term effects upon the ecology of the treated areas? What will be the impact of these tons of chemicals upon fish and wildlife and the recreation that depends upon them? What will be the effects upon the many beneficial insects and invertebrates which form the food base of many of our game species? Unfortunately no one at the present time can answer these questions or many others with any degree of clarity.

All too little research has been conducted to date. Even among the biologists and entymologists there is disagreement, even on such basic problems as the effect of the fire ant on agriculture and the actual need for its control. A small amount of research has been done by the states and by the Fish and Wildlife Service on the biological impact of mass insecticide treatment. Research done by the chemical companies themselves has been confined largely to studies of the effects upon the human system and upon those of domesticated livestock in order to determine safe limits of application.

Much of the information that we have to date on the direct effects of aerial blanket spraying of dieldrin and heptachlor on wildlife comes from Alabama where much of the recent fire ant eradication program has been centered. This information, with the scraps available from other states, is far from encouraging. In a study conducted by the Alabama Cooperative Wildlife Research Unit, a beaver pond within the area treated by the Department of Agriculture for fire ant control was studied intensively three years ago. The area was sprayed on March 25-28. Between those dates and April 21, 175 dead fish were picked up on the shores of the pond. Brown thrashers, common before the spraying, were not found there after treatment. Rabbits were killed off, but were found to be making a recovery at the time of the report on May 23. Frogs were found to be still dying when the report was made. Twenty-five separate species of birds and mammals were found dead on the area between the dates of spraying and the release of the report.

On an upland area of 4,100 acres in Alabama similarly treated last spring by the Department of Agriculture for fire ant eradication, 87 per cent of the quail were killed. Doves were reported dropping dead. A fox den on the area was found containing 13 foxes, five of which died in convulsions after being removed, and a dead house cat was found on the area. The total number of birds and mammals found dead on this area was 300.

In Louisiana a similar study was conducted on an area treated with DDT, a much milder toxicant than dieldrin or heptachlor. Louisiana is the most important woodcock wintering ground in the United States and an important waterfowl wintering area. Earthworms on a control area were decreased severely by treatment, and nearly all domestic ducks in one community were killed. Losses to songbird nests were heavy.

In North Dakota losses to waterfowl after spraying of grainfields with dieldrin last year were found to be heavy and lasted 24 days. Dieldrin sprayed for the control of riceleaf miners caused heavy local losses of birds in California, while in the same state the treatment of orchards with dieldrin at the comparatively low rate of one-half to one and one-half pounds per acre killed cottontail rabbits, jackrabbits, and mice. In eastern Texas field workers noted heavy losses among quail, songbirds, and fish after treatment.

These are only a few of the many examples of direct killing of valuable fish and wildlife through the application of chemical pesticides. Many other losses undoubtedly have occurred which were not observed by qualified biologists or naturalists and which, therefore, have never been reported.

Spectacular though these direct kills may be, however, what concerns the

MAJOR PROBLEM lies with the user, whether commercial contractor, governmental agency, or individual farmer. All should be aware of potential dangers and possibilities of accident, errors in human judgment or carelessness. Properly applied, most pesticides are safe to humans and wildlife.

biologists most is not the direct but the cumulative and indirect effects of these spraying operations. Dieldrin, toxaphene, DDT, and the other chlorinated hydrocarbons are extremely stable, retaining their toxicity for long periods of time. In slightly acid water, for instance, toxaphene may maintain its potency to kill fish for years, as found by research workers in Texas. When an area is sprayed once at rates of application sub-lethal to fish and wildlife, a certain proportion of the chemical is washed into the soil and stored there. When the area is resprayed, the residue continues to build up after each application, and although any single spraying may not be directly toxic to higher forms, some crops are sprayed several times during each growing season. Lethal doses of chemicals gradually build up in the soil, eventually to be washed by rains into water courses or to be picked up with grit and food by birds.

Similarly, the food supplies of insectivorous birds are destroyed or contaminated. Workers in Louisiana are investigating losses of woodcock on the wintering grounds of this species attributed to their eating earthworms contaminated by dieldrin applied in the fire ant control program. In the contamination of the Miramachi and Yellowstone drainages previously referred to, the loss to aquatic insects was found to be nearly complete.

Beneficial insects—scavengers, pollinators and predators on pests—also are heavily killed by aerial spraying. Mollusks are particularly susceptible to killing by the chlorinated hydrocarbons. The result of heavy and continual application of these chemicals can only be a complete upsetting of traditional and natural predator-prey relationships, and the possible extirpation of desirable forms over large areas.

Another factor is the development of strains of lower forms of insects immune to standard spray doses. This has already been noted in Florida where DDT application at low intensity for mosquito control at first appeared to be almost completely effective. Later it was found that a DDT-tolerant strain had evolved, and that even heavy dosages of the poison failed to have an appreciable effect. While this might appear to offset the

RESEARCH by chemical companies has largely been confined to studies of the effects upon human life and that of domestic livestock in order to determine safe limits of application.

fear that beneficial insects will be destroyed over wide areas, the answer of the spraying contractors is usually a massive application of a much more potent chemical.

Last but not least are the dangers to human life. There have been numerous deaths attributed to carelessness in handling such poisons, and medical men are becoming increasingly concerned about their indirect effect on man. One doctor has stated that he attributes the increase in certain blood diseases to these chemicals and the discovery of a new lung disease has just been announced. The discoverers cite among other possible causes these new insecticides.

These are some of the problems and case histories. What can we do about them? The chemical companies are meeting a public demand, and some of the larger firms are making efforts to minimize threats to wildlife. The major problem lies with the user, whether commercial contractor, governmental agency, or individual farmer. One of the most important steps would be the establishment of the closest possible working relationships between the fish and game agency and the agency or agencies within each state working on or interested in insect control. In some states this already has been achieved, but in others the liaison between the two points of interest is thin or virtually nonexistent. Work could well be started in each state to interest the public health agencies and extension service personnel in alerting the users of pesticides of their potential dangers and to minimize hazards of accident, human judgment, or carelessness.

Here are some of the things the investigator should determine in studying local applications of chemical pesticides:

1. Pre- and post-application populations of birds and animals on an area sprayed, or comparative censuses on the area after spraying and on a comparable check area of the same size, far enough removed from the study area to be immune to effects of the spray.

2. The pesticide used, obtaining this information directly from the label on the container, where possible.

3. The dosage; the amount of actual pesticide applied per acre; how much water, oil, or other carrier was added to the pesticide.

4. Method of application, type of equipment used, and the uniformity of coverage.

5. Time and frequency of application.

6. Weather conditions, wind velocities and direction, precipitation, before, during, and after application.

7. Gross effects on birds and other life, looking for any unusual behavior, changes in population numbers, ages and sex ratios. Information should be obtained where possible whether effects are from direct contact with the chemical or were caused by ingestion of contaminated food or water. Suggested census procedures may be obtained on request from the Patuxent Wildlife Research Refuge.

8. Chemical analysis of tissues. Specimens found dead on the study area may be prepared for analysis by freezing or by removing the digestive tract, liver, heart and brain and placing these tissues in 70 per cent alcohol. Weight of the bird or animal and of the tissues should be obtained wherever possible. Frozen specimens should be packed in dry ice and sent to the laboratory by prepaid air express. A limited number of analyses can be made at the Patuxent Research Refuge subject to prior arrangements before shipping samples. Specimens should be identified by species, date collected, symptoms observed, and history of pesticide applications.

All data should be analyzed thoroughly in an attempt to arrive at the most logical explanation of the findings. The possibility that other factors might be responsible should never be overlooked.

All facts available at present indicate that the application of chemical pesticides for the control of harmful insects will present a growing threat to wildlife within the near future, a threat that can be minimized only through intensive study of the problem by all agencies concerned and by close cooperation among these agencies at state, federal, and local levels. The problem already is urgent, and there should be no room for interdepartmental bickering or singlemindedness. Properly applied, the new pesticides present a potent weapon against undesirable insect pests. I firmly believe that with adequate facts and the development of harmonious working relationships between responsible governmental agencies, the objectives of the present programs can be achieved with minimum losses to desirable wildlife. In many instances, losses already reported might have been eliminated or minimized by the substitution of selective mixtures, altering spraying patterns and similar practices. Where such steps are impractical, the only recourse of the wildlife administrator is through legislative channels. The laws of too few states provide protection for wildlife against the indiscriminate use of potent chemicals.

In my judgment, the present uncontrolled distribution of exceedingly deadly poisons is a major threat to both aquatic and terrestrial wildlife, and perhaps to man himself. Certainly there should be more information on both the immediate and long-term effects of such toxicants, but there also should be much more rigid controls of its use than exist in most states.

If it is the duty of the agricultural agencies to do all they can to control pests harmful to the farmer, it is equally the duty of every fish and game agency to protect the resources under its control for the benefit of the general public.

PROPERLY APPLIED the new pesticides present a potent weapon against undesirable insect pests. Chemicals play an important role in fruit production from Pennsylvania orchards but in some cases, they have caused mortality among rabbits, pheasants and other forms of wildlife.

Almost the Cure-all
For Dwindling Wildlife . . .

THE PRINCIPLES OF GAME MANAGEMENT

Part V—Habitat Restoration

By John Madson and Ed Kozicky
Conservation Department—Olin Mathieson Chemical Corp.

THE most basic of modern game management methods — and the one that comes nearest to being a "cure-all" for dwindling wildlife — is game habitat restoration.

Game habitat is the complex of soil, water and plants, commonly called "cover," in which game birds and mammals exist. It is the "life range" that must include escape cover, winter cover, food and water, cover to rear young, and even cover to play. A lack of one or more of these cover requirements must be corrected if the habitat is to support game in harvestable numbers.

The condition of the soil and its plant covering determines the wildlife yield of any area. Although this concept has been extolled many times in the past quarter-century, it is not yet widely appreciated. To the average hunter, the bulldozing of a brushy fence-row will always lack the spectacular drama of a Cooper's hawk striking a covey of quail. However, the loss to the hawk is temporary; the loss to the bulldozer is permanent.

Generally, the increased habitat requirements of modern man have worked to decrease the available game habitat and the quantity of most

American game species. Man has profoundly changed the types and distribution of game food and cover and has generally destroyed, created, or shifted the tenable habitats of game species.

The classic example of this is the Missouri prairie chicken. Originally, much of northern Missouri was prime habitat for this grouse, but as the land was plowed and put to grain, the prairie habitat—and the prairie chicken—swiftly vanished. The birds disappeared first from the most fertile soils and then, with advancing land use, from many second-rate soils. Today's remnant prairie chicken population is found in the poorest parts of the original range and none of these grouse remains on the best Missouri soils, where they have been dispossessed by man.

Game habitat is dynamic. Cover conditions constantly change, and these changes influence the quantity and distribution of game. The most important of these changes is plant succession, as demonstrated by the evolution of a grassy field into brushland. Game management attempts to direct plant succession in the right direction at the right time and place. Planting, fencing and fire protection advance the plant succession; cow, axe, plow and fire reverse it.

The most important single tenet of game management is that if there is any breeding stock at all, the only thing that we can do to raise a game crop is to create a favorable habitat. Population pressure guarantees a rapid spread of a game species to all accessible range – if that range fills the species' needs. For example, on Protection Island in Oregon where eight pheasants—six hens and two cocks—were liberated in the spring of 1937, an inventory in the fall of 1941 revealed more than 1,500 pheasants.

There are several great deterrents to widespread habitat restoration on private lands:

1. Cost of initiation and maintenance of habitat.
2. Lack of immediate results.
3. Limited knowledge of habitat requirements of many game species.

BORDER CUTTING of woodland edges along crop fields has a double benefit. It increases crop yield, provides good return in sale of forest products, and creates ideal cover for wildlife. It is one of the best of modern game management methods to improve habitat for game birds and animals.

The high cost of effective game habitat improvement usually discourages extensive private projects. Quail habitat projects on large southern plantations may result in fall population densities of one bird per acre, but the cost may be as much as $50 per quail, and has been known to exceed $1,500 for each quail harvested. This high initial price is only part of the expense, for plant succession inevitably takes place and maintenance is required to sustain a habitat type.

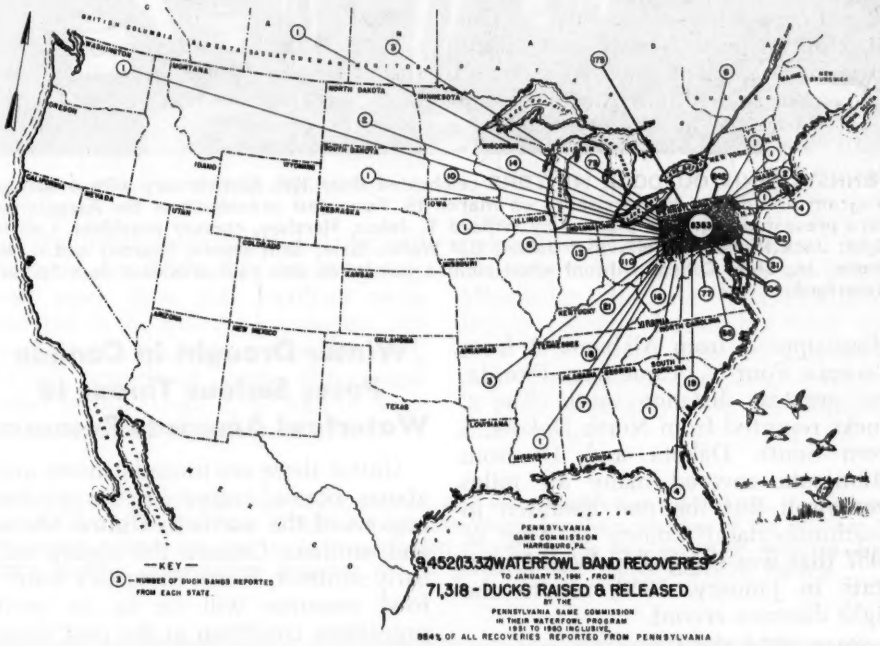
Habitat restoration programs may require five years or more to produce marked increases in local game supplies. In addition to this, game production may be curtailed by adverse weather conditions during spring and summer. And so, since it is an American trait to want immediate results, such short-run game management techniques as stocking and predator control are most warmly embraced by the average sportsman.

But although habitat improvement is the most important single game management principle, we have much to learn of game physiology and the social tolerances of wildlife. The more we know of the life history and habitat requirements of a game animal, the more efficiently we can manage this species. Much basic research on game and habitat requirements is still needed.

Game habitat restoration can never succeed on a broad scale if it conflicts with agricultural interests. If, however, restoration is conducted concurrently with farm improvement programs, it can be an effective and economical way of increasing farm game supplies. A multiflora rose hedge, for example, is both wildlife cover and windbreak; such a living fence is a cheap way of confining cattle and providing a travel lane between a source of food and escape cover.

In short, the future supplies of farm game depend on the economical development of acceptable game management practices that are compatible with modern agriculture.

MULTIFLORA ROSE HEDGE has provided improved game habitat and also serves as a permanent, inexpensive fence around pastures or other farm fields. With proper care and maintenance, it can be a valuable, beautiful addition to any farm.


— KEY —
(3) — NUMBER OF DUCK BANDS REPORTED FROM EACH STATE
PENNSYLVANIA GAME COMMISSION HARRISBURG, PA.
9,452 (13.3%) WATERFOWL BAND RECOVERIES
TO JANUARY 31, 1961, FROM
71,318 - DUCKS RAISED & RELEASED
BY THE PENNSYLVANIA GAME COMMISSION IN THEIR WATERFOWL PROGRAM 1951 TO 1960 INCLUSIVE.
88.4% OF ALL RECOVERIES REPORTED FROM PENNSYLVANIA

Pennsylvania Waterfowl Management Program Includes Pond Building and Duck Releases

The Game Commission has, for years, reared and released ducks and established shallow lakes. These are related programs toward increasing the waterfowl population and hunting success in Pennsylvania.

In all, the Commission has raised, leg-banded and released 71,318 ducks in the state since 1951, the year the project was initiated.

During that 10-year period 9,452 waterfowl bands have been recovered. This figure represents 13.3 per cent of the liberated ducks. Hunters in Pennsylvania returned 8,353 of the bands. A map showing where the state-released ducks were eventually bagged and reported, appears like a sunburst pattern. Not only were the reported birds shot during migration to southern and eastern wintering areas, during other states' seasons, many of them did the unpredictable. For example, reports were received from Canadian Provinces in the following numbers: Quebec, 6; Ontario, 175; Manitoba, 3; and Saskatchewan, 1. The largest number of the ducks reported from a state was 242, from New York. Ohio hunters returned 110 bands. Maryland reported 104, Virginia 77, Michigan 75, North Carolina 66, and New Jersey 62. One return, or more, came from each of the New England States.

In the Deep South, 3 duck bands were recovered from Arkansas, 1 from

PENNSYLVANIA OUTDOOR WRITERS celebrated their 10th Anniversary with a special program and dinner in Harrisburg on March 18. Four past presidents of the Association were presented engraved plaques by Willard T. Johns, Hershey, current president. Left to right: Jack Richards, Pottsville; Johns; Bill Walsh, Erie; Seth Myers, Sharon; and A. R. Grove, Jr., State College. Absent when picture was taken was past president Jess Spiker, Waterford.

Mississippi, 7 from Alabama, 1 from Georgia. Four (4) came from Florida, the greatest distance south. The 2 ducks reported from North Dakota, 1 from South Dakota and 10 from Minnesota covered many air miles westward. But the one liberated in Northumberland County in May of 1957 that was bagged in Washington State in January, 1960, retains the flight distance record.

Since 1954 the Game Commission has completed 30 of the marsh pond impoundments, principally from central Pennsylvania westward. These operations included planting areas adjacent to the dams to plants attractive to waterfowl.

Three other projects, two of them extensive, are in the process of construction. One is a series of dams that will aggregate 112 water acres on State Game Lands No. 213 in Crawford County. The other involves the Pymatuning Goose Management Area in the same county, on which are located 16 small dams.

Land is being acquired in the Counties of Susquehanna, Bradford and Wayne in northeastern Pennsylvania, on which the Commission plans to develop many small marsh impoundments.

Winter Drought in Canada Poses Serious Threat to Waterfowl American Resource

Unless there are unusual snows and above normal rains in the prairie regions of the northern United States and southern Canada this spring and early summer, North America's waterfowl resource will be in its most precarious condition in the past three decades, the U. S. Department of the Interior recently reported.

Officials of the Bureau of Sport Fisheries and Wildlife, Fish and Wildlife Service, say this area has been responsible for up to 75 per cent of the annual continental waterfowl crop.

Although all three of the Prairie Provinces—Alberta, Saskatchewan, and Manitoba—are regarded as dry, the main moisture deficiency lies in Saskatchewan, the most extensive of the best duck producing areas. Moisture in that Province has not been so low since the 1930's.

Due to the absence of late season moisture there is no frost in the ground, thus no "soil seal." This means normal precipitation will tend to be absorbed by the ground rather than collected in the potholes necessary for the nesting birds.

Commission Land Managers Get Set for Spring Program

The "deep-freeze," snowy months of January and February caused many a person to wonder when warm, pleasant weather would again be enjoyed. But, guided by past experience, Game Commission land management personnel followed normal mid-winter procedure. They prepared to improve the wild game environment on State Game Lands, Farm Game Projects and other lands the Commission administers.

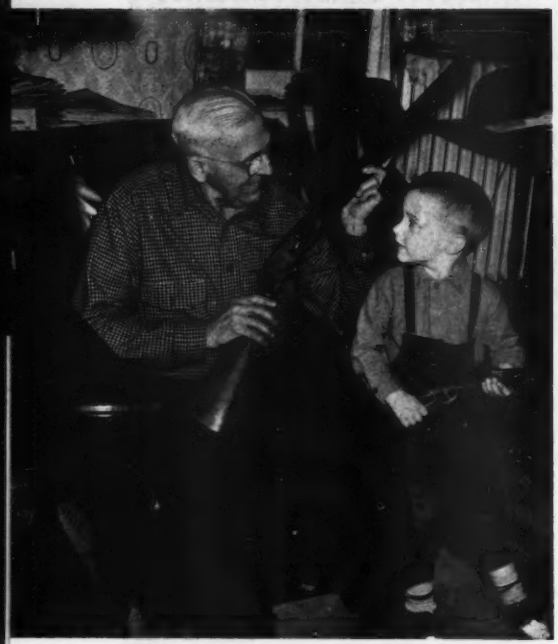
Equipment was overhauled and put in good condition for use in spring, and seed, lime and fertilizer were ordered in the following amounts: 286 bushels of corn, oats and millet seed; 17,525 pounds of grass, clover and other legume seed; 2,347 tons of limestone; and 579 tons of fertilizer.

Missouri Conservationist Succeeds Ross L. Leffler as Fish and Wildlife Secretary

Frank P. Briggs, 66, Missouri newspaper publisher and a 14-year veteran on that State's Conservation Commission, has been appointed Assistant Secretary of the Interior for Fish and Wildlife. He succeeds Ross L. Leffler of Pennsylvania, the first man to hold the post which was created by the Fish and Wildlife Act of 1956.

Briggs was a Missouri State senator for 12 years and a member of the U. S. Senate for about 1½ years. He was appointed to fill out the unexpired term of Harry S. Truman when his fellow Missourian became Vice-President. Briggs recently began his third six-year term on the Missouri Conservation Commission, the longest record of continuous service in the Commission's history.

EXPLORER SCOUTS of Post No. 3, Canton, Pa., were honored at the Capitol, Harrisburg, on March 20, the first day of National Wildlife Week, for their winning of the William T. Hornaday Award, top citation in conservation offered by the Boy Scouts of America. Full story of their conservation program will be given in next month's GAME NEWS.



RETIRED GAME PROTECTOR Blair J. Davis, of Media, still takes an active interest in hunting and youth, especially his 4-year-old great-grandson Jimmy Flanagan. Now 82, Davis retired from Commission service in 1945.

North American Wildlife Conference Attracts Nearly 1,500 Conservationists

Nearly 1,500 international authorities on renewable natural resources management, conservation administrators, biologists, outdoor writers, and sportsmen attended the 26th North American Wildlife and Natural Resources Conference that was held March 6-8 in Washington, D. C., according to the Wildlife Management Institute. Represented in the registered attendance were conferees from the United States, Canada, Mexico, England, Scotland, Australia, and Sweden.

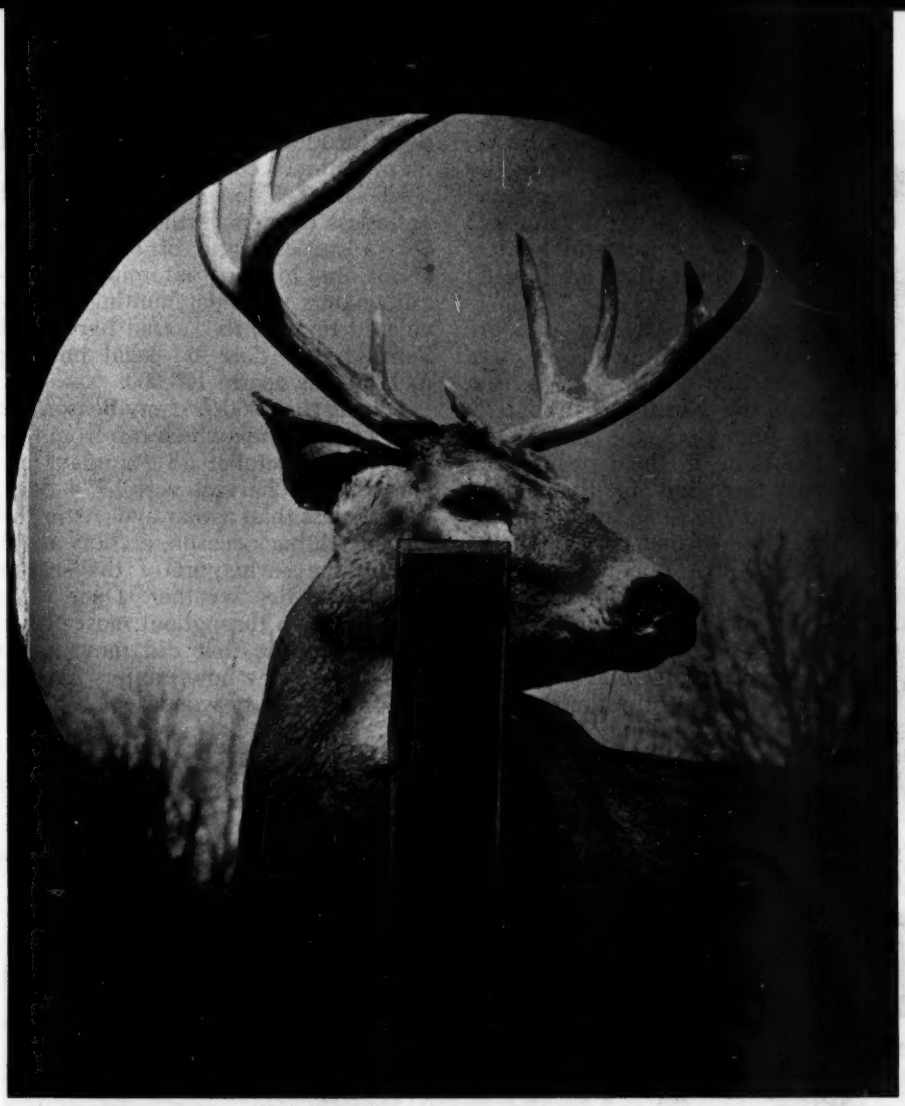
The theme of this year's meeting was "Planning for Population Pressures."

Pennsylvania State University Invites Teachers to Enroll in Conservation Education Lab

For the 16th year Pennsylvania State University will conduct a Conservation Education Laboratory for Teachers this summer. In cooperation with 10 state and Federal conservation agencies, the University offers a rich three-week outdoor education experience to elementary and secondary school teachers and administrators. Stimulating field trips, interesting lectures and demonstrations, and lively group discussions will provide pertinent and practical information about natural resource management and how conservation can be incorporated in standard school curricula.

The Laboratory is open to both men and women with two sessions scheduled to accommodate up to 50 students in each session. The first session runs from June 19 to July 7; the second session from July 10 to July 28. Tuition for Pennsylvanians is $60; for non-Pennsylvanians, $120. In addition, there is a General Course Fee (covers payment for bus transportation on field trips, field and laboratory equipment) of $20 and a charge for housing and meal service of $65. Many scholarships are available, however, from 22 contributing groups and organizations. Three credits are granted by the University for work satisfactorily completed. These credits may be applied toward an undergraduate degree or toward an advanced degree if and when the student is admitted to the Graduate School. The courses may also be used to satisfy credit requirements of the appropriate teaching or administrative certificate issued by the Pennsylvania Department of Public Instruction.

For additional information and application blanks, write: H. S. Fowler, Director, Conservation Education Laboratory, 311 Burrowes Building, The Pennsylvania State University, University Park, Pa.



High Kill of Buck Deer Highlights Pennsylvania 1960 Wildlife Harvest

Despite unseasonably high temperatures, dry and noisy conditions in the woods, and no snow during the first days of Pennsylvania's 1960 deer season, Keystone State hunters bagged 38,776 bucks—seventh greatest number in the past 20 years. On the basis of reported kills since 1915, the 1960 figure ranks tenth. During the past 10 years, the 1960 buck kill was sixth highest. In 25 counties the buck kill exceeded that of 1959; in 17 counties the harvest remained virtually unchanged; and in 24 counties there was a decrease.

The highest buck kill was scored by hunters in Centre County, with a harvest of 1,695 antlered animals. Clearfield followed closely with a reported kill of 1,659 and Potter was third with 1,602. Other counties with a reported buck harvest in excess of 1,000 animals were Clinton, Elk, Huntingdon, Lycoming, Pike, Somerset,

Tioga and Warren. It should be remembered that repeated checks by Game Commission field personnel have revealed the fact that from 25 to 30 per cent of successful hunters fail to report deer that are legally taken.

On opening day hunter pressure was reported as a little higher than on the first day of the 1959 season throughout the Northwest, about 20 per cent higher in the Southwest, about the same in the Northcentral, somewhat increased in the Southcentral, about the same in the Northeast, and close to that of 1959 in the Southeast. The best opening day prize reported was a 17-point buck weighing 165 pounds, taken in Warren County.

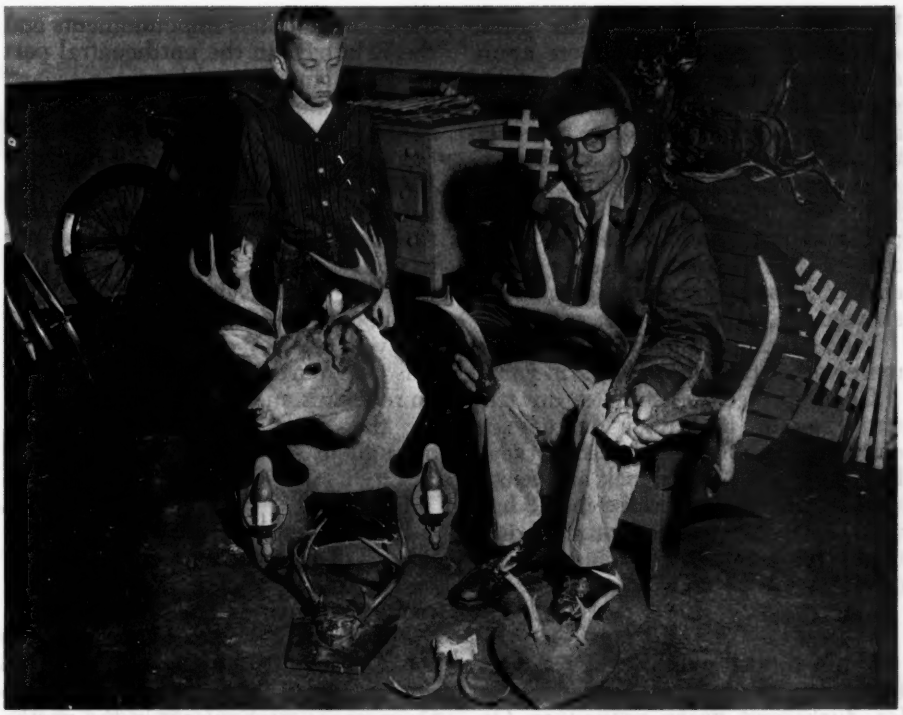
By December 17, the one day established for a harvest of antlerless deer through permits totalling 230,050, all of the Commonwealth was blanketed by snow. In many sections it was too deep for ideal hunting conditions and many hunters could not get into favorite areas. The reported harvest of antlerless deer, nevertheless, was 29,887—a success ratio of one deer to about nine hunters, assuming all permit holders were out hunting. A calculated total of the actual harvest of Pennsylvania deer by legal hunting in 1960 was nearly 100,000.

During the 1960 Archery Season for deer of either sex which ran from October 1 to October 28 (Sundays excluded), the harvest was 1,174 deer, slightly less than a year ago. As in the December buck season, archers afield during the early part of the season found hot, dry weather. Deer were bedded down throughout most of the day, and those that did move were easily alerted by bow hunters moving through the noisy woods.

Bear

Pennsylvania's 1960 hunting season

SUCCESSFUL BEAR HUNTER Richard Park, of Edinburg, downed this 200-pound bruin in Forest County on the opening day of the 1960 season.



DEER ANTLERS from bucks harvested in Venango County during the past few years are displayed by Francis Dunlap, of Franklin. All the deer were taken within a radius of two miles from his home. The set in his left hand is from his 1960 buck. Dunlap has noted steady antler improvement in recent years.

on black bears opened on November 28, the Monday after Thanksgiving, and closed on December 3. Again, wool-clad hunters wished for lighter clothing on the first few days of the week due to warm, dry weather. The kill of bears, however, showed an increase over the previous year with 392 legal bruins reported bagged by successful hunters. Fourteen of these trophies weighed 400 pounds or more. Counties in which the greatest numbers of bears were harvested (and the number taken) were: Lycoming, 46; Elk, 41; Cameron, 35; Tioga, 28; Pike, 25; Clearfield, 23; McKean, 21; Centre and Monroe, 18 each; Forest, 17; Warren, 16; Clinton and Potter, 15 each; and Jefferson, 14. Hunters reported bears weighing 400 pounds or more from Cameron, Clearfield, Clinton, Elk, Luzerne, and Lycoming counties. The largest bear of last season was reported taken in Elk County. Field dressed, this fine trophy weighed 480 pounds.

Small Game

Pennsylvania's 1960 small game season opened October 29 in comparatively warm, clear weather across most of the state. Hundreds of thousands of sportsmen were afield and many returned with proof the birds and game animals were available for the accurate shooter. Heavy fog, however, in some western counties delayed eager hunters until almost two hours after the opening hour. In Chester and Delaware counties a light rain dampened hunting spirits somewhat during the early hours. In most areas, conditions underfoot were described as "too dry and noisy for good turkey and grouse hunting." Over much of the state the cottontail rab-

bit, America's most popular game animal, was reported as "more abundant" or "fairly numerous—about the same as last year." Some southwestern and northwestern counties, however, reported the popular cottontail population was considerably down. In a few western counties the ringneck pheasant population appeared below that of last season, but everywhere else in the state the gaudy game birds showed an encouraging increase.

Woodland small game results were more varied than those on farm game.

Game protector estimates for the entire season indicate a decrease in cottontail rabbits, squirrels, turkeys, bobwhite quail, woodcock and snowshoe hares but an increase in the harvest of raccoons, ruffed grouse, ringneck pheasants, woodchucks and doves.

Waterfowl

Much to the wildfowlers' chagrin, Pennsylvania's 1960 waterfowl season for ducks and geese opened on October 22 in hot, dry weather. Low water in streams, beaver dams and marshes also helped reduce the number of available duck hunting areas. In many counties of the state, nevertheless, hunters found more than the anticipated number of migrant ducks and geese, along with locally-reared ducks. Large numbers of hunters enjoyed plenty of shooting in the northwest—on Pymatuning Reservoir, on State Game Lands impoundments and the Erie bay. In the northcentral part of the Commonwealth, potholes and beaver dams in the more northern counties provided considerably better bags of ducks than did opening day 1959. On sections of the Susquehanna River and along a number of streams the shooting success varied from poor to excellent.

Over-all, Pennsylvania duck hunters did not bag as many ducks and geese last year as they did in 1959 but this was due partly to the closed season on redheads and canvasbacks and also to the lack of stormy weather throughout most of the season.

Snowshoe Hare and Grouse

Both number of hunters afield and bag of game were low on December 26, opening day of Pennsylvania's snowshoe hare season and first day of the experimental extended grouse season. Cottontail rabbits were also legal quarry for the third year in a row. Deep snow, particularly in the northern counties; rain or mist in the western part of the state; a break-through ice crust in the southwest; drifted roads; and impossible conditions for good dog work all combined to keep all but a few hunters at home. Hunting conditions did not improve later in the week and the harvest of all three species was low.

The official 1960 small game harvest in Pennsylvania follows:

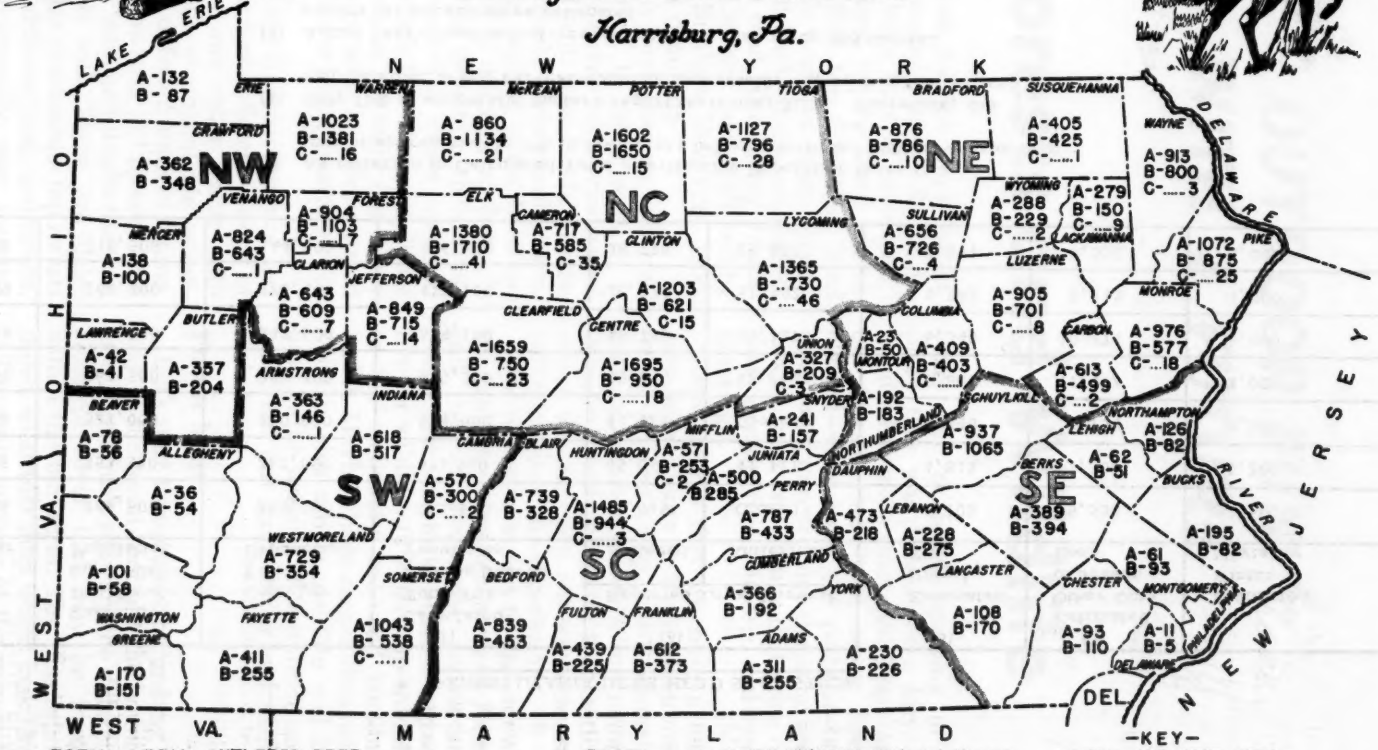
SPECIES	*1960*	*1959*
Rabbits (cottontails)	1,116,183	1,441,505
Hares (snowshoes)	997	1,679
Squirrels (gray, black and fox)	508,705	512,655
Raccoons	122,853	111,356
Wild Turkeys	14,920	15,228
Ruffed Grouse	56,868	45,277
Ringneck Pheasants (males)	481,626	461,025
Quail	19,598	20,844
Woodcocks	11,230	12,250
Rails, Gallinules and Coots	4,637	4,681
Wild Waterfowl	45,228	53,870
Woodchucks	270,208	259,224
Doves	81,795	57,475

1960

Deer and Bear Harvest

Pennsylvania Game Commission

Harrisburg, Pa.



TOTAL - LEGAL ANTLERED DEER..... 38,776
TOTAL - LEGAL ANTLERLESS DEER..... 29,887
GRAND TOTAL..... 68,663
(INCLUDES DEER BY ARCHERS: ANTLERED-346, ANTLERLESS-828)
TOTAL - LEGAL BEARS..... 392

A-COUNTY UNKNOWN..38(included in total)
B-COUNTY UNKNOWN..19(included in total)

-KEY-
A-LEGAL ANTLERED DEER
B-LEGAL ANTLERLESS DEER
C-LEGAL BEARS
(Based Entirely On Kill Reports)
FIELD DIVISION BOUNDARY

PENNSYLVANIA DEER HERD STATISTICS

Year	Calculated Pre-Fawning Adult Population	Calculated Fawn Production	(1) Calculated Total Pre-Hunting Season Population	(2) Reported Legal Harvest		(3) Estimated Illegal Kill	(3) Estimated Other Out-of Season Loss	Estimated Winter Mortality
				Antlered	Antlerless			
1954	348,500	259,000	563,500	40,915	Closed	4,105	5,582	2,500
1955	353,350	262,800	571,500	45,044	41,111	4,815	7,306	1,200
1956	327,000	250,000	534,600	41,921	Closed	6,348	8,738	2,500
1957	362,500	285,300	599,300	49,254	55,862	6,867	11,172	3,000
1958	333,600	247,600	539,100	46,738	65,187	6,340	10,471	5,000
1959	262,400	186,400	417,100	38,270	51,902	5,782	9,115	1,000
1960	216,500	144,800	336,600	38,776	29,887	4,891	8,533	4,000

(1) As reflected in Calculated Total Pre-Hunting Population there is a loss of approximately 17% in fawn class between birth and hunting season.

(2) Only 70% of successful hunters report their deer kills. Therefore, the calculated or actual harvest would be appreciably higher than that shown.

(3) Actual year-round out-of-season losses to man made and natural causes far exceed these estimates.

Forests and Wildlife

IF YOU look for the word "forest" in a dictionary, you will find it defined as "a large tract of woodland." When you look up the word "woodland," you find the definition "land covered with wood, or trees; forest." You are right back where you started.

But if you read "The Living Forest" by Jack McCormick and published by Harper and Brothers, New York, 1958, you find this definition:

"A forest is more than an area covered with trees. In many ways, it is like a city—nature's city—constructed and peopled with trees, birds, insects, shrubs, mammals, herbs, snails, ferns, spiders, fungi, mosses, mites, bacteria, and a myriad of other living forms."

Let's use that definition, then, as we explore a forest—any forest—and find out how animals live there. We'll use that idea, too, as we carry out a few conservation projects in a forest aimed at creating better living conditions for wildlife.

But there are different kinds of forests, composed of different groups of trees, shrubs and other plants with different kinds of animal life associated with the different kinds of forests.

There are lowland wet forests, with one group of trees and shrubs that can live in moist soil. There are drier mountain sides or mountain top forests composed of different trees and shrubs. There are reasonably new forests—forests that are now growing on what might have been a farm a hundred years ago, or forests growing in a place that was burned over fifty, a hundred or more years ago. There are old forests that have never been cleared—some trees cut perhaps—but continuing to reproduce the same species of trees and shrubs that grew on that same site three hundred and more years ago.

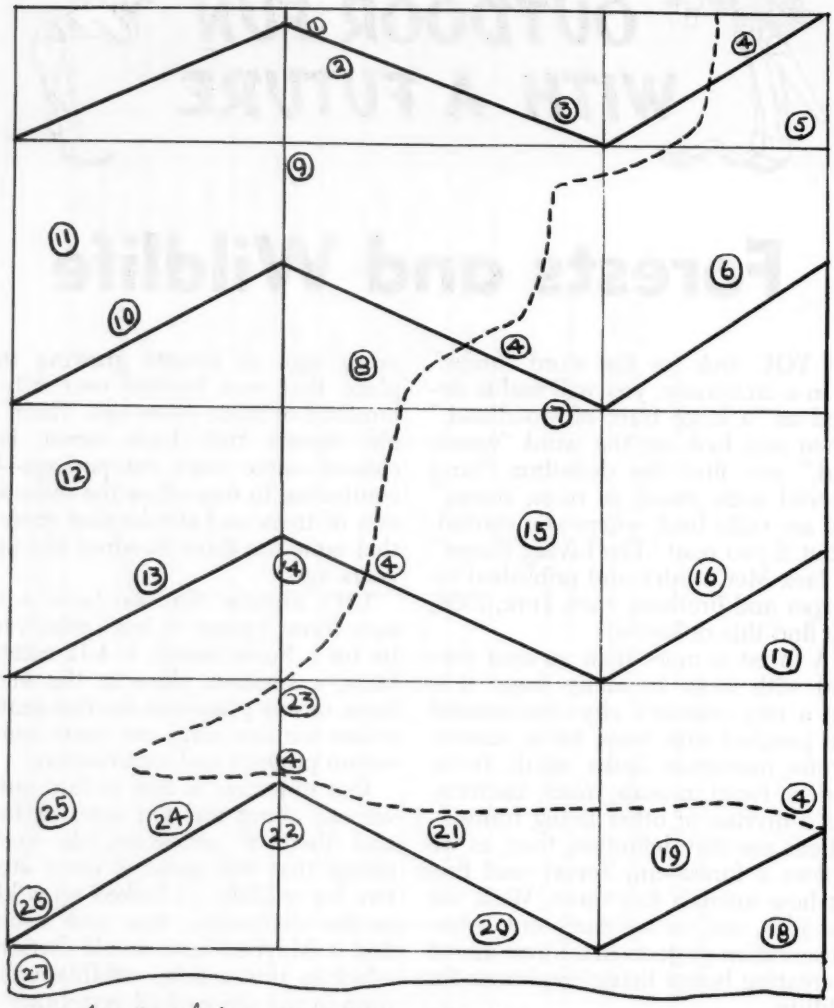
Let's assume that we have a ten-acre forest (more or less) which may be on a Scout camp, a 4-H camp, a farm, a summer place in the mountains, or any place else for that matter, where we can carry out some conservation projects and experiments.

Our objective is first to find out all we can about this ten acres of forest and then, if necessary, do certain things that will make it more attractive for wildlife. (I looked up wildlife in the dictionary, too, and couldn't find it. Maybe I have an old dictionary—but in this article, wildlife will be used in the sense of all vertebrate animals, not just game birds and mammals.)

Forest Map

Let's start this project by making a map of the forest—not just the boundaries, but a map showing the different kinds of cover that may be found within the ten acres. The illustration shows what that map would look like.

The main purpose of the map is to find out what we have to work with and to get down on paper a visual



1 Heard Bob-White
2 Woodchuck den
3 Woodthrush singing
4 Deer run
5 Catbird nest
6 Woodpecker drumming
7 Squirrel nest
8 Blue jay
9 Red Squirrel
10 Raccoon tracks
11 Blue jay
12 Cotton tail
13 Crow's nest
14 Squirrel nest
15 Oven bird singing
16 Flicker nest
17 Brown thrasher
18 Morning Dove
19 Fox droppings
20 Raccoon tracks
21 Oven bird singing
22 Skunk tracks
23 Woodthrush nest
24 Wood turtle
25 Cotton tail
26 " "
27 King bird

description of the forest so as projects are carried out, we have a running record of what has happened. We also have a "plan" of what we hope to accomplish in the future.

Animal Census

The next thing to do is make an animal census of the ten acres. Place a piece of tracing paper over the map and mark off zig-zag lines as shown in the illustration. Now, use a compass to walk along those lines. As you walk keep a record of the animals you see or the signs of animals that prove without a doubt that certain animals live in that area. Use your own code to indicate on the map the animals found.

It probably would be necessary to walk through the area several times to check your findings and to look for new evidence that you missed before.

But as you walk, looking and listening, you'll note that the largest number of animals and the largest variety is where there is the largest variety of plants, all the way from low growing sedges, grasses or ferns, to medium-height shrubs, to young trees to large trees.

There are animals that live and feed at all elevations in a forest from underground to the tops of the tallest trees, so when plants grow at all heights, all these animals have the living space, the nest sites and the feeding places they need. You will see, too, that in a forest with a thick layer of leaf mold on the ground, an interesting variety of animals will be found. This layer, only a few inches deep, supports a tremendous amount of life, from bacteria and microscopic animals to snails, shrews, mice, and the larger animals that feed on the smaller ones.

You could spend hours or even weeks just exploring a few square feet of the forest floor and making a list of what you found.

Probably the easiest way to see for yourself that different animals live at different heights is to use insects and spiders as an example. Get a dozen or so sheets of old-fashioned flypaper, if it is available, or make your own using one of the commercial products sold in feed or garden shops to smear on trees to keep insects from crawling up or down.

Place the sheets of flypaper at different heights (tacked to trees, with the sticky side out) from ground level up as high as you can climb, at eight- to ten-foot intervals. Check the flypaper a few hours later and see how the insects and spiders are different at different heights.

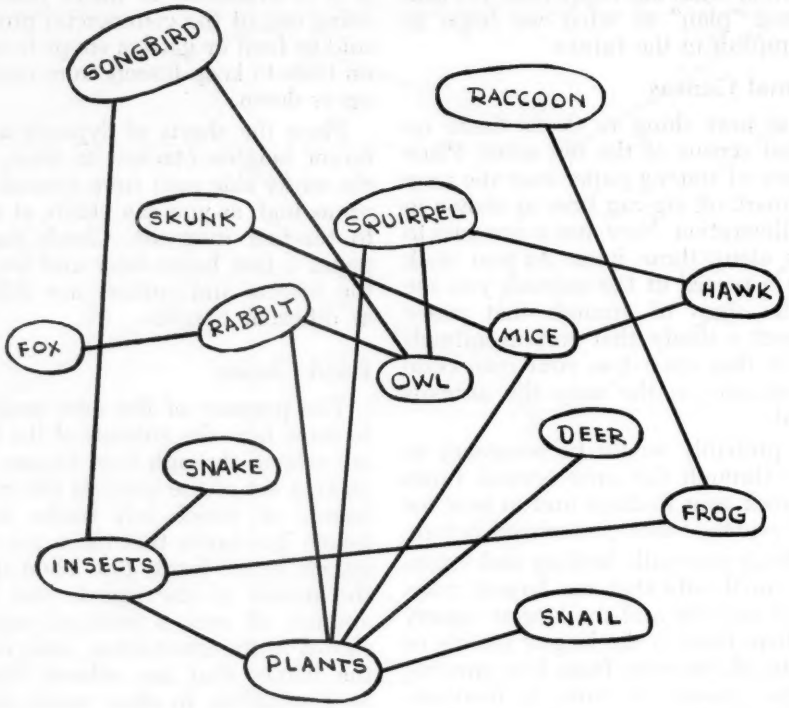
Food Chains

The purpose of the next project is to show how the animals of the forest are related through food chains. First make a list of the animals you saw or heard, or which left tracks in the forest. You know that there are many insects in the forest too. Then spread the names of the insects and other animals all over a piece of paper as shown in the illustration, and connect the names that are related through feeding habits. In other words, skunks eat turtle eggs, so you connect the name skunk with the word turtle. A fox might eat a deer mouse, so you connect these two—but skunks might also eat the mice, so you connect "skunk" and "mouse." When you're all through, you will have a rather complicated looking page of criss-crossed lines—but you'll realize as never before how inter-related are the animals that live in a forest, and how they all depend basically upon the forest plants for food.

Habitat Improvement

There are many things that can be done to make a forest area more attractive for wildlife.

One thing to do if the woodland is an old one with large trees that shade out undergrowth—or a dense stand of second growth trees that also shades out undergrowth, is cut trees to provide woodland openings. Blocks of



trees can be cut to let the sun reach the ground.

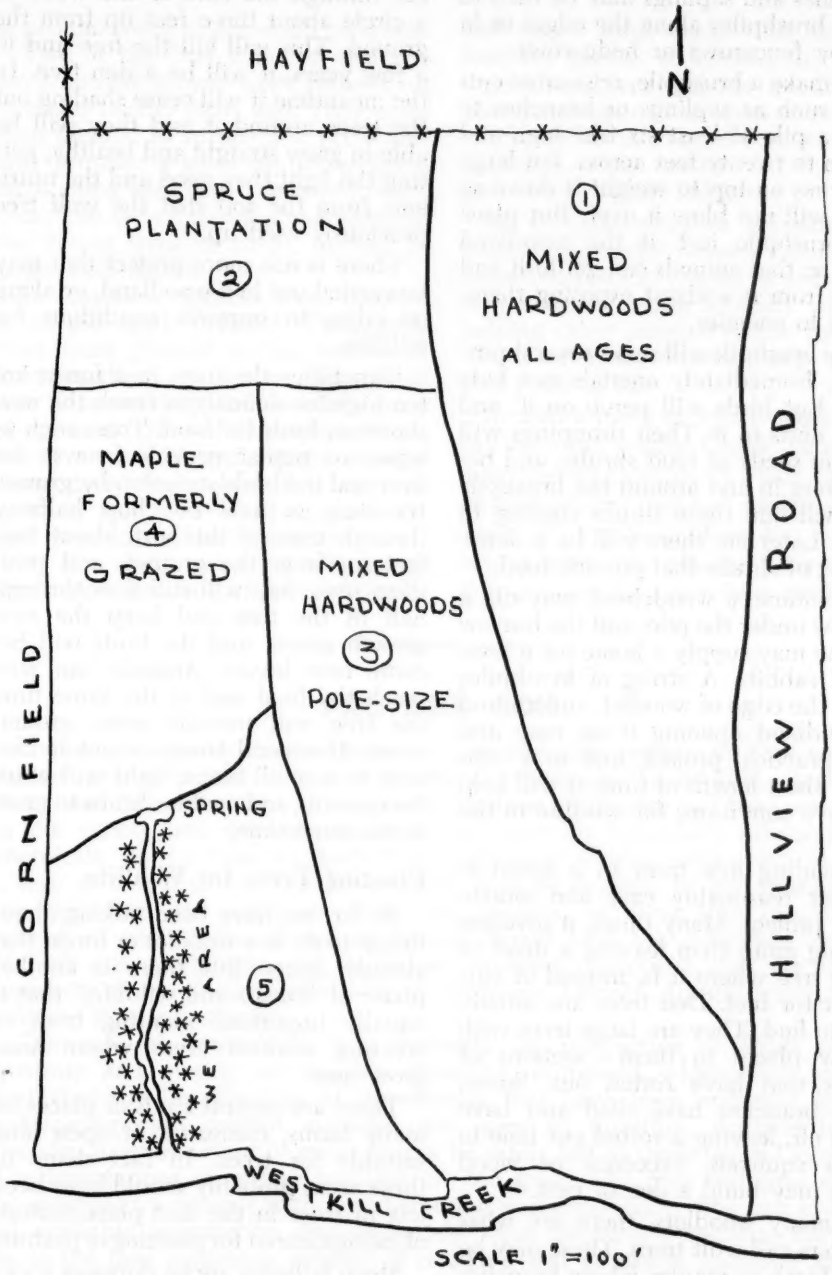
Two things will happen. The stumps may produce some new shoots or sprouts that will grow densely and provide browse and cover. Other shrubs that need light will grow for a few years until the trees again shade them out. But in the meantime, these shrubs such as blackberry, raspberry, elderberry, and others will provide food and cover.

Along the edge of the woods, a twenty- or thirty-foot wide strip of trees can be cut. A heavy growth of brush will then come up because the sun can get at the ground. This brush will provide food and cover, and will also act as a windbreak. It will slow up the drying winds and push them up over the forest, thus helping to keep the woodland soil moist so that young trees can grow. The young trees in turn provide browse and buds for animals to eat.

Sooner or later, of course, trees will again grow along this border, and to keep it as a brushy border, you will have to cut it over every few years.

The chief purpose of these two kinds of cutting is to provide different stages of plant growth in and along the edges of the woodlot or forest and to break up large stands of trees. These different stages of growth and a larger variety of shrubs that will grow in such openings help provide the three things that animals need to live and increase in numbers.

The trees or saplings that are cut to make these openings should not be wasted. If large enough, they may be used for saw logs. If not, they may be useful as fence post or fuel. The


HAYFIELD
N
SPRUCE PLANTATION
2
1
MIXED HARDWOODS ALL AGES
MAPLE FORMERLY
4
GRAZED
MIXED HARDWOODS
3
POLE-SIZE
CORN FIELD
SPRING
5
HILLVIEW ROAD
WESTKILL CREEK
SCALE 1"=100'

branches and saplings may be used to build brushpiles along the edges or in nearby fencerows or hedgerows.

To make a brushpile, criss-cross cuttings such as saplings or branches to form a pile at least six feet high and fifteen to twenty feet across. Put large branches on top to weight it down so wind will not blow it over. But place the brushpile just at the woodland edge, so that animals can get to it and away from it without exposing themselves to enemies.

The brushpile will serve several purposes. Immediately animals can hide in it. But birds will perch on it, and build nests in it. Their droppings will contain seeds of food shrubs, and before long in and around the brushpile you will find these shrubs starting to grow. Later on, there will be a dense thicket of shrubs that provide food.

Meantime, a woodchuck may dig a burrow under the pile, and the burrow in time may supply a home for a family of rabbits. A string of brushpiles along the edge of woodlot, and around a woodland opening is an easy and very practical project, and in a relatively short length of time, it will help improve conditions for wildlife in the area.

Providing den trees in a forest is another reasonably easy and worthwhile project. Many times, it involves nothing more than leaving a dead or dying tree where it is, instead of cutting it for fuel. Den trees are usually easy to find. They are large trees with hollow places in them – sections of trunks that have rotted out. Sometimes branches have died and have fallen off, leaving a rotted out hole in which squirrels, raccoons or wood ducks may build a den or nest.

In many woodlots, there are what foresters call wolf trees. These may be huge birch or maples whose branches spread out and shade out more desirable trees. Many of these wolf trees would make fine den trees, but they are still sound and healthy. They may be killed by girdling. Use an axe, and cut through the bark to the wood in a circle about three feet up from the ground. This will kill the tree and in a few years, it will be a den tree. In the meantime it will cease shading out the trees around it and they will be able to grow straight and healthy, getting the light they need and the nutrients from the soil that the wolf tree previously used up.

There is one more project that may be carried out in a woodland, or along its edge, to improve conditions for wildlife.

Sometimes the trees in a forest are too high for animals to reach the new shoots or buds for food. Trees such as aspen or poplar provide browse for deer and the buds are eaten by grouse. It's easy to saw or chop halfway through trees of this sort, about four feet up from the ground, and push them over. Sap will still flow through half of the tree and keep the new growth green; and the buds will become new leaves. Animals can now reach the food and at the same time the tree will provide some ground cover. If several trees are cut in this way in a small block, light will enter the opening and enable shrubs to grow at the same time.

Planting Trees for Wildlife

So far, we have been talking about things to do in a woodlot or forest that already exists. But there is another phase of "forests and wildlife," that is equally important–planting trees or creating wooded areas where none grow now.

There are several kinds of places on many farms, campsites or open land suitable for trees. In fact many of these areas probably should have been left in trees in the first place instead of being cleared for planting or pasture.

Steep hillsides, rocky slopes or rocky field, the edges of ponds or streams, eroded gullies, abandoned pastures or abandoned farmland – all may be planted in trees, and planted so that they are beneficial for wildlife as well

as productive of future wood products.

Two of the best areas on which I have hunted grouse were farmed up to about twenty years ago. They were then planted in spruce and pine—and now produce a good supply of game birds along with new tree growth each year. The secret, though, was planting the young trees in strips, instead of large solid blocks.

In one area, spruces were planted in an old apple orchard. The young trees were planted in the open area between the rows of trees. The result now is something like this: five rows of spruces (planted 8 feet apart in a row); a row of apple trees planted about forty feet apart; five rows of spruces; another row of apple trees, etc., covering about fifty acres.

In the open areas in which the apple trees grow are all sorts of shrubs and small hardwoods that provide food for grouse. Of course, the apple trees themselves provide good food. The dense growth of spruces provide ample cover in the coldest weather. Together, they make an excellent grouse and rabbit habitat.

All of these projects are aimed at improving wooded areas for game animals—but you can't make an area more attractive for game animals without helping other animals in the process. That food chain sketches helps prove that point in part.

So find a piece of woods where you can work this spring. Check the results over the next couple of years against an unimproved plot and see the difference. It's really outdoor fun with a future when you can see for yourself that conservation practices work.

PRO AND CON

"It is agriculture's responsibility to see that the people of this country derive maximum benefit from agricultural chemicals. To do this, of course, they must be used safely. If we are to continue producing the food we need, in the variety and quantity we want, we have no immediate substitute for chemicals. In my book we have the competence to deal with them in such a way as to derive full benefit without harm to anyone. In my opinion any program that will eliminate from this country, or even stop the further spread, of an introduced pest or disease should have the outspoken support of both conservationists and regulatory agencies concerned with the wholesomeness of our food supply."—W. L. Popham, Deputy Administrator, Agricultural Research Service.

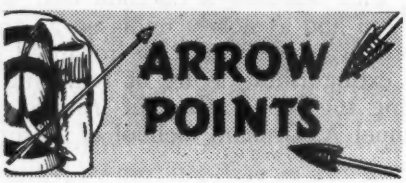
"The use of insecticides is a necessity for production of foods in the quantity and quality we require. However, numerous widespread projects involving the broadcasting of insecticides that have been endorsed by the public-supported control agencies are open to question. Apparently the decision to spray or not to spray cannot be safely left to those control agencies. The temptations of empire building are too great. The pros and cons should be weighed by persons with broad training and experience, who can evaluate all available information dispassionately, thus reaching a decision that will be in the best long-term interest of mankind and as nearly unbiased as possible. The application of insecticides over large areas must be regarded as an emergency treatment, comparable to extinguishing a fire or removing a man's appendix. Control projects involving the broadcasting of insecticides should not be entered upon lightly.—Samuel A. Graham, School of Natural Resources, University of Michigan.

A Bow Hunter's Diary
Of the 1960 Archery Season . . .

The Balance Sheet

By Tom Forbes

A STATISTICAL record of the 1960 any-deer archery season is a poor mirror in which to view in retrospect the many benefits which accrue to the bowmen who roam Penn's Woods in October. Measured in terms of the kill, the season might be called a failure – only two bow hunters for every hundred who purchased licenses reported that they had been successful in bagging a deer. But not subject to statistical measurement is the beauty of the autumn foliage in the wooded sections of Pennsylvania, days in which it is a pleasure to be outdoors, and always the thrill of matching wits with the elusive white-tailed deer.



An intimate picture of one bow hunter's season in the form of a daily diary kept by Burle Schofield, of New Cumberland, is truly representative of the pleasures each of us enjoy when we carry our bow into the hunting field.

"The following daily account was kept to see the actual hours and contacts made with deer in an ordinary season, and to show any doubters that archery hunting is frustrating, challenging, and also a teacher of patience.

"Oct. 1 – York County near New Cumberland. One doe and two yearlings entered field above me about a

half hour before quitting time. I was concealed along fence row in heavy brush. The big doe was working slowly down the fence row with the two small deer trailing. I thought to myself, as she moved along, it couldn't be possible to get a deer the first day and I was nervous. Suddenly she froze and craned her neck in my direction. I never made a move but I felt a slight breeze coming out of the hollow behind me, and I knew what had happened. She had winded me and in one minute the three deer bolted back into the woods. 1½ hours.

"Oct. 3—Same place as above. None. 1½ hours.

"Oct. 4—Party of four archers hunted in Henry's Valley, Perry County. Jumped deer in darkness going to stands. Spooked two deer on small ridge while still hunting at 9:30 a.m. One member missed a small spike buck and saw a doe at 3:30 p.m. Another member saw two deer out of range. 8½ hours.

"Oct. 5—South Mountain near Dillsburg. None. 3 hours.

"Oct. 7—Fishing Creek Valley near Manada Gap. None. 2 hours.

"Oct. 8—Fishing Creek Valley near Manada Gap. Jumped three deer in heavy laurel. Tried a stalk on them for two hours. I saw them a few times but could not get near them as they were aware of me. Hunters in the area all saw deer with a few missing shots. 2¼ hours.

"Oct. 10 — Henry's Valley, Perry County. Jumped two deer in woods. Saw one crossing road in front of car at noon. Two others crossed road at 4:00 p.m. I jumped out of car and ran down steep bank to try and cut them off. I couldn't locate them so I sat by stream for about ten minutes when I saw them sneaking across stream about seventy-five yards away. 9 hours.

"Oct. 11 — Manada Gap, Dauphin County. Jumped five deer just before shooting time on way to stand. While still hunting about 9:30 a.m. along scrub oak I stopped to look over woods and instantly saw a movement to my right of a deer heading for the nearby heavy cover. There was a narrow valley through the cover which would offer a possible shot. A big doe walked across it slowly with her head to the ground smelling for acorns. I loosed the arrow and it looked true but I lost sight of it on the way toward the deer. I heard a muffled sound and the deer bounded into heavy cover and stopped. I could see her vaguely. She stood frozen but it was too thick for a second shot. Her actions did not indicate that I had hit her. She stood for about ten minutes and then slowly melted into the brush. I walked up to the spot where I had shot at her to look for signs of a hit. After a short search of the area I found my arrow angled in the leaves. It was clean with no signs of blood or hair, and no signs on the ground cover. I followed her imaginary trail into the brush and searched for telltale signs of a hit for over an hour until I was satisfied that everything showed indications of a clean miss. After careful thought I was satisfied that the shot must have passed directly under the deer's belly.

"This was the most exciting day of the season. I had shots but was frustrated by my inability to get in a good shot. Jumped another deer in the thicket at 4:00 p.m. No chance to shoot. At 6:00 p.m. I was slowly working toward my car and spotted a lone deer feeding along the edge of a farm field. I made a fast wide stalk to come down wind of the field for a chance at the deer. As I neared the field there was a big stand of hemlocks to my right. Shortly I was at the edge of the field and looked up and down cautiously but the deer was not in sight. After a few minutes I decided to backtrack through the nearby hemlocks. Just as I entered the stand of trees I heard a loud snort ahead of me and saw a deer break into a lope and stop about eighty yards away. The low hanging branches of the trees made a hard angle for a shot that long

TYPICAL ARCHERS Bob Hickman and Al Duca, of Erie County, compare brodheads used during the 1960 season. More than 68,000 bow hunters were licensed last year, reporting a bag totalling 1,174 animals.

but the deer was standing in the open between two trees, and after the morning episode I was itching for another chance no matter how tough the odds. I released an arrow. The flight looked good, on a straight line about the middle of the deer's side. About ten yards short of the target the arrow bounced off of one of the low hanging boughs and buried itself in the soft needles under the tree.

"On the way to the car at quitting time I heard more noise in the brush but I hardly turned my head to take notice. After the day's events it all seemed hopeless. Three more deer crossed the road while I was getting in the car. What a day! 9½ hours.

"Oct. 13 — Manada Gap, Dauphin County. After the other day's troubles here it was a wonder that I returned, but the fresh nippy air and smell of leaves makes one forget the previous day's failures. Three deer crossed the road at the same spot but too early for legal shooting, which sometimes makes a hunter think they watch the clock too.

"A small hump not as high as the ridge runs near the scrub oak and it is very heavily covered with laurel and low growth. We decided to take stands in this area and not move off it until noon. Deer were filtering through this area throughout the morning but the thickness made a shot impossible. Seeing the deer all morning kept up interest in hopes that the next one would offer a shot. Saw about ten deer during the morning. Kicked one up near fields at 5:15 p.m. No shot. One older hunter had a stand near the field and stayed there most of the day. He reported that a trio of deer were wandering up and down the rows of corn all day but none exposed themselves. One little fellow was real friendly. The hunter said that this small deer kept walking around the edge of the field and every time he passed the hunter the little deer would look the hunter up and down and

keep on moving. The hunter did not give a thought to shooting him as he was so small. He still had very light spots on him. 9½ hours.

"Oct. 14—Stonehead in South Mountain. No deer. 2½ hours.

"Oct. 17—Perry County. Rattlesnake Ridge. 1 deer. No shot. 6 hours.

"Oct. 18—Marysville on State Game Lands. No deer. 4 hours.

"Oct. 19 — Andersonburg, Perry County. Good deer sign. Lots of buck rubs. This was unfamiliar territory to us. I saw or jumped about twelve deer in heavy cover near an old lumbering operation. The woods are very dry and nearing the critical stage. It started to rain at quitting time which should help the still hunters. 9¾ hours.

"Oct. 20 — Stony Creek, Dauphin County. No deer. 3 hours.

"Oct. 21—Hunted small wood lots in Northern York County. No deer. 3 hours.

"Oct. 24—Manada Gap. Saw 4 deer. No shots. 4 hours.

"Oct. 25 — Hunting near York Expressway with cars whizzing nearby. I had noticed deer crossing here at times so I thought it might be a nice spot for a quick close hunt. Saw four deer in this area and had a shot at a doe moving through pine trees near Conewago Creek. The arrow deflected off pine branch with no hit. 3 hours.

"Oct. 26 — Conewago Creek, York County. 4 deer with no shots. 4 hours.

"Oct. 27 — Conewago Creek, York County. No deer. 3 hours.

"The season has ended and all too soon it seems, but it was a wonderful time. Not counting time for eating and other different things I spent approximately 90 actual hours in the fields and woods. I saw approximately 50 deer and heard probably 20 or 30 more. I had three shots with two of them through heavy cover and one very good shot that I missed with no excuses. Woods in the southern part of the state were dry the first couple of weeks.

"In all this time in the woods I saw very few hunters. We ran into a few concentrations near Manada Gap but many a day I saw no one and the hunter had to depend on the deer's natural movements or his own still hunting ability. I hunted all or parts of 19 days.

"I don't know whether this report makes me an average bow hunter, because I have never shot a deer with the bow and arrow and I have hunted for seven years now. But it is a wonderful sport and the challenge is so strong that you just can't shake it off. If any skeptics think it is so easy, tell them to get out in the deer woods in October."

And that, fellow bow hunters, sums up the archery deer season for 98 per cent of us. Nevertheless we do like to review the over-all picture which follows:

A total of 68,051 licenses were issued to bow hunters and the bag totalled 1,174 deer. The bag included 346 antlered and 828 antlerless deer. Of this total 102 were bagged by nonresidents. Potter County was first with 105 deer; Forest second with 88; third Warren with 54; fourth Lycoming 49; and fifth Sullivan with 48. Deer were bagged in all but three counties in the state—Lawrence, Philadelphia, and Snyder. Only one deer was reported from each of six counties: Beaver, Crawford, Fulton, Greene, Mercer, and Washington.

A total of 77 violators paid $3,685 in penalties during the 1960 season. The principal violation was using an automobile to hunt deer. Eighteen bow hunters were convicted of this violation. Seventeen convictions were for hunting after hours and 13 bow hunters paid the penalty for spotlighting deer while in possession of bows and arrows. There were 5 violations for each of the following: Shooting or hunting within 150 yards of occupied buildings, attempting to kill a second deer, transporting untagged deer, hunting without special license.

Thirteen accidents were reported to the Game Commission. One of these

resulted from an arrow shot at a deer. The arrow passed over the back of the deer and struck a hunting companion in the right shoulder. They had become separated in the brush and the bowman who shot at the deer did not know the location of his hunting companion. The accident was non-fatal. All of the other accidents fall into a pattern which does not vary from year to year. They are self inflicted or inflicted by a companion close by. Arrows carried knocked in the bow or carried loose in the hand cause the majority of accidents. They catch in brush or the bow hunter slips and falls. In one case the arrows were in a bow quiver which does not have a metal protection for the arrow heads. The bowman leaned over to pass under some brush and an arrow in the bow quiver cut his left leg about three inches below the knee. These accidents are preventative. A firm rule to carry all arrows in a bow or other quiver which has a metal pocket which completely covers the broadheads will prevent these accidents.

The high point in bow hunting licenses was reached in 1959. From an initial issue of 5,442 licenses in 1951 in which 33 antlered deer were killed to 76,767 in 1959 with a bag of 1,409 combined antlered and antlerless deer, there was a steady increase each year in archery license sales. In 1960 there was a drop of 8,716 in the sale of licenses.

The success ratio attained in the first any-deer season in 1957 was 1 deer for every 41 bow hunters. During the past season the ratio was 1:58.

FEDERATION ISSUES NEW SONGBIRD STAMPS

A special, limited edition of a new series of Songbird Stamps has been released by the National Wildlife Federation. Each sheet of stamps portrays 48 birds from all sections of the country. They are lithographed in six brilliant colors silhouetted against a pure white background for sharpness of detail and ease of identification.

A 14-page album has been designed specifically for this new series, containing information on range, size and habitat of each bird as well as the scientific names. In addition, general information on attracting, identifying and feeding birds is included.

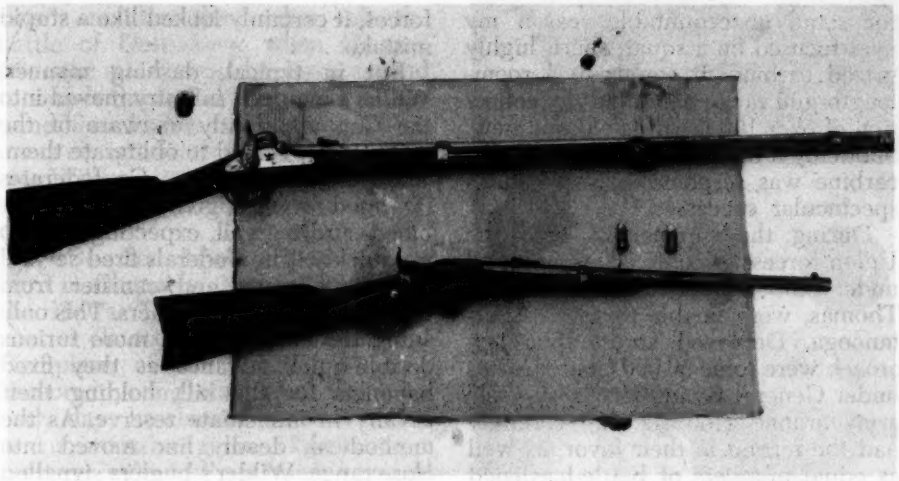
For complete information on prices and how to order the stamps and album, write the National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington 6, D. C.

SEE YOUR STATE GAME LANDS

Woodland walks become more appealing as summer starts and shooter-outdoorsmen feel the urge to visit favorite hunting localities to preview game prospects.

Proud of its extensive program through which food and cover are developed for wildlife, the Game Commission invites the public to visit State Game Lands and view the accomplishments. The program is the result of long-time planning and operations which develop larger, healthier game populations through the production of the wildlife necessities.

The Commission recommends scheduled tours. Any field officer will provide information necessary to planning such a guided trip. A person casually strolling over the public lands usually will overlook work done and that in process to assure continued good hunting. Therefore on-the-spot information by an experienced wildlife man will make the excursion into the open more rewarding.



CIVIL WAR WEAPONS show a marked contrast between the standard .58 caliber muzzle-loader, top, and the Spencer carbine in .52 caliber and capable of firing 15-18 shots per minute.

The Gun You Could Load On Sunday and Fire All Week . . .

SECRET WEAPON OF THE CIVIL WAR

By Jim Varner

A CENTURY ago this summer our nation was in the throes of an unfortunate, heart-rending conflict which, from the standpoint of sheer brutal courage, expenditure of lives and ferocity, has never been equalled. Like all wars, the Civil War caused a rash of new inventions. Some were practical; the majority were of little value. The aim was to get the utmost in equipment and firepower into the field in the shortest possible time. All of the inventions in the ordnance field were aimed at producing more accurate and faster firing weapons. Out of this maelstrom of inventions emerged the "Secret Weapon of the 1860's."

Recently, in the quiet of my den, I became deeply engrossed in an exceptionally interesting treatise on Colonel Wilder's famous "Hatchet Brigade," later known as the Lightning Brigade. The history of this young commander and his daring, mounted infantry, some 4,000 strong, reads like a thriller dealing in the impossible. As I followed one episode after another of this dashing, cunning officer of the Army of the Cumberland, I paused in deep reflection and

for some unaccountable reason my eyes focused on a squat, short, highly prized carbine. It stands in a room-length gun rack containing my collection of over 160 firearms old and new. Suddenly it dawned upon me that this carbine was responsible for Wilder's spectacular successes.

During the summer of 1863 the Union forces, some 45,000 strong and under the leadership of General Thomas, were unable to reach Chattanooga. Deployed across their approach were some 50,000 Confederates under General Bragg. His "gray-wall" army around Hoovers Gap certainly had the terrain in their favor, as well as equal numbers of battle-hardened infantry and cavalry. It was a well-known fact that Confederate cavalry was far superior to the Army of the North. When General Thomas ordered Wilder's "Hatchet Brigade" to charge through the Gap some seven miles ahead of the main force and into the numerically superior Confederate forces, it certainly looked like a stupid mistake.

TEST FIRING the Spencer carbine shows average recoil as it sends 350 grains of lead on the way to target. Tommy Price, Scranton gunsmith and firearm authority, tries out this secret weapon of the Civil War.

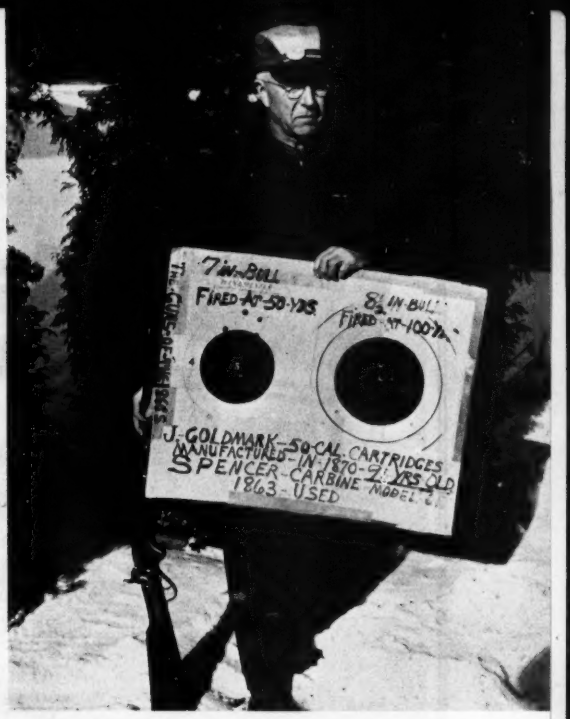
But in typical, dashing manner, Wilder's mounted infantry moved into the Gap apparently unaware of the death-trap planned to obliterate them. The over-confident Confederates swarmed forward, giving vent to their blood-curdling yell, expecting to mop up quickly. The Federals fired several rounds of grape and canister from their few, light six-pounders. This only stung the enemy into a more furious double-quick advance as they fixed bayonets for the kill, holding their cavalry in immediate reserve. As the methodical, deadly line moved into close range, Wilder's buglers signalled the men to commence firing. The bugle notes released man's newest device for total annihilation of his kind—the Spencer breech-loading, repeating rifle. There was no delay after the first volley because the soldiers did not have to laboriously ram home a muzzle-loading musket charge. Volley followed volley in rapid succession as Wilder's 4,000 men were capable of firing up to 60,000 shots per minute against the 6-8,000 per minute with the muzzle-loaders.

That first accurate and well-timed volley stunned and stopped the Confederates momentarily but they tried again, then broke and ran as the firepower of the Union forces reached a peak never known before. Bragg rushed a fresh brigade into the fight, led by a cavalry charge outnumbering Wilder's men five to one. The cries of wounded men, the neighing of frightened horses and the crash of artillery added to the obligato of 4,000 Spencer carbines created a battle scene that was a nightmare second to none. The Spencers won the day as the confused enemy broke and ran in the mistaken belief that they had mistakingly attacked a force that outnumbered them at least six to one. I might just add that my maternal grandfather, William Pickens of Cloverdale, Ind., served with Wilder's Hatchet Brigade. He was wounded

later on the third day of the battle of Gettysburg when General Lee sent a large cavalry force around to smash the Union army rear at the same hour Pickett was making his famous charge. Lee's cavalry ran smack into Wilder's brigade and the Spencer carbines chopped them to a bloody defeat.

Christopher Miner Spencer was born in Connecticut sometime during the 1840's. The little town of Manchester claims the honor of being the birthplace of this spare built, dry humored young machinist. From his early days he showed unusual ability as an inventive genius. Possessing a most versatile, brilliant mind, he could turn his thoughts and skills to almost anything. For over ten years he experimented on firearms while working as a tool maker and locomotive repairman for the New York Central and as a machinist for the Cheney silk mills. He even perfected a horseless carriage powered by steam. It had a unique although crude differential and steering tiller which enabled it to turn corners at full speed. In what was probably the first automobile accident in the United States, Spencer's horseless carriage collided with a milk vendor's wagon in Boston in 1862. Spencer's real brain-child, however, was his breech-loading, seven-shot repeating carbine patented in 1860.

It was the first really successful repeating rifle firing self-contained metallic cartridges. It was both a breechloader and a repeater. The seven-shot tubular magazine was inserted in a hole in the buttstock. This magazine had a follower spring which kept the cartridges constantly under pressure, pushing them forward to take their place in the chamber ready for firing. They were hefty 52 caliber rim-fire cartridges one and a half inches long, loaded with 45 to 48 grains of high grade black powder. The inside-lubricated, 350 grain slug (plus or minus 10-20 grains) was fairly well designed but it still was a


7 IN BULL
FIRED AT 50 YDS
8½ IN BULL
FIRED AT 100 YDS
J. GOLDMARK - 50 CAL CARTRIDGES
MANUFACTURED IN 1870 - 91 YRS OLD
SPENCER - CARBINE - MODEL
1863 - USED

FINE GROUPS were fired at 50 and 100 yards, using cartridges that were 91 years old. The carbine was sighted about five inches high at 50 yards, still fired a little high at 100 yards.

lot of lead for such a light powder charge. The cartridge cases of Civil War vintage were all copper but they have stood the test of time admirably well. Certain makes will fire as reliably and with the same zip as when they were first manufactured 90 to almost 100 years ago. It's hard to say that much about modern cartridges of any make.

You will note from the photos used to illustrate this article that the Spencer rifle is capable of rather amazing performance, especially when you consider the age of the rifles and ammunition used in our tests. The cartridges we used can never be replaced and are worth fifty cents to a dollar each as collection pieces. The brand new Spencer with 22 inch barrel is from my collection while the older, lighter rifle with 20 inch barrel is from Edward Turnbull's collection. He is an instructor of mathematics and engineering at Keystone College, Factoryville. His carbine's number

PENETRATION TEST of the Spencers shows the path of the 350-grain bullet driven by 45 grains of black powder through ten inches of hard and soft pine boards. This display of brute force from such a stubby little cartridge 91 years old is nothing short of amazing.

was "5839" while mine was "20928." The group shown in the photos was made at 50 and 100 yards with my carbine. I was using ammunition made by J. Goldmark of New York in 1870; it was therefore 91 years old. It grouped high at 50 yards but was not far off at 100. The penetration tests really surprised us, as well as everyone else to whom we showed them. The somewhat pointed 350 grain slugs consistently drove through 10 inches of dry pine, some of it not the soft variety. The shattering effect of this slug put me in mind of a 20 gauge rifled slug, shot from a shotgun, but with much greater penetration. No wonder horses and men crumpled under its impact. Its killing energy seems to be way out of proportion to the stubby 1½-inch cartridge carrying only 46 grains of powder. Recoil, however, is moderate and the report not as sharp as you would imagine. I broke two cases down and found they were loaded with 46 and 47 grains of the nicest, uncaked black powder I ever saw. Not one of the J. Goldmark cartridges showed any signs of hangfire; they were like brand new ammo.

During the Civil War over 200,000 Spencers in carbine lengths were purchased and nearly 50,000 rifles saw service. They probably did more to shorten the war than any other piece of ordnance used but they lived only a short life after the war, probably due to their low velocity and not too good balance. Some Spencer rifles were used by big game hunters and others were involved in some Indian skirmishes. It's hard to believe, however, that General George Custer, who performed so brilliantly at Gettysburg with his Spencer-equipped cavalry, was wiped out by the Sioux Nations at the Little Big Horn. The story might have had a different ending if Custer and his men had been armed with the rapid-firing Spencers instead of the single-shot Springfield carbines.

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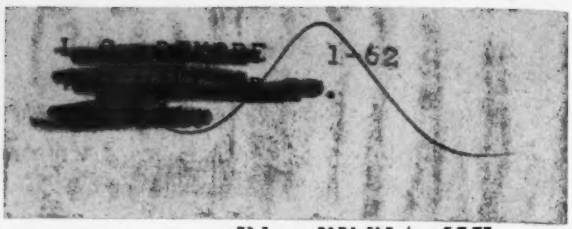

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